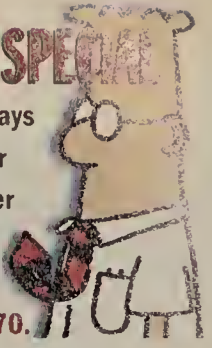
NOVEMBER 18, 1996 VOLUME 13, NUMBER 47

NetworkWorld

THE NEWSWEEKLY OF ENTERPRISE NETWORK COMPUTING



DILBERT SPECIAL

Scott Adams pays homage to your awesome power in a series of Dilbert® comics. Page 70.

Hospital proves anyone can be a LEC

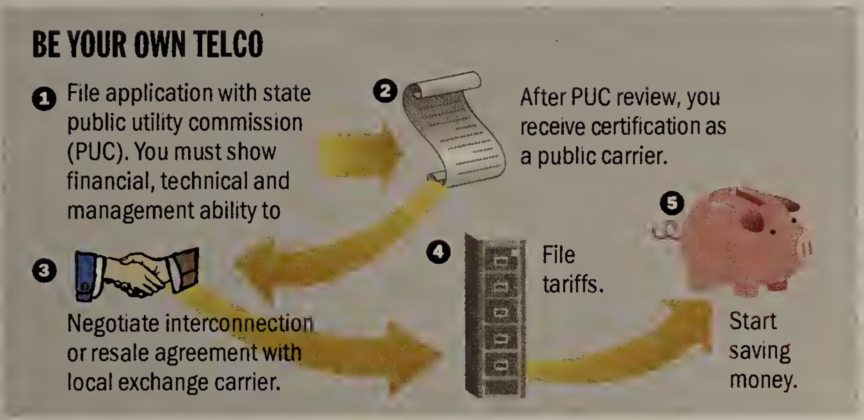
By Tim Greene
Tallahassee, Fla.

The Telecommunications Act of 1996 is about to pay off big for Tallahassee Memorial Medical Center, which has exploited a provision of the law to set up its own phone company.

The medical center expects to save between 10% and 30% on local phone service by tapping its newly created affiliate — Tallahassee Memorial Telephone Co. (TMT) — instead of buying from a monopolistic local exchange carrier (LEC). TMT is in negotiations to buy service from Sprint Centel Florida at wholesale rates. The new phone company can then turn around and resell service to the medical center at a price well below retail.

And even more savings may be in the offing because the law allows companies that own PBXs to become their own local carriers to avoid long-distance access

See TMT, *page 109*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Novell NDS giveaway counters Microsoft

NDS gateway aimed at slowing Microsoft directory gains.

By Christine Burns
San Jose, Calif.

Novell, Inc. is giving away its most prized possession — Novell Directory Services (NDS) — in a bold gamble to fight off threats from archrival Microsoft Corp.

Novell's *Tom Arthur says Unix vendors are welcome to NDS.*

The company last week announced it will give away NDS source code to any Unix operating system vendor, application developer or Internet service provider that wants to resell the technology — without paying royalties — as an integral component of its products. Novell said it would also make a binary version of its NDS for Windows NT product available to OEM partners next year.

To enhance NDS as a universal directory tying resources and users together across a network, Novell plans to add support for the Lightweight Directory Access Protocol (LDAP), native IP and the Dynamic Host Configuration Protocol.

Novell hopes to make NDS a de facto standard for connecting disparate operating systems. With NDS code sprinkled throughout the industry, Novell would have a wider installed base into which to sell NetWare and IntranetWare, as well as NDS add-ons and other products.

NDS is Novell's technology jewel. But with NetWare sales slowing, the company faces the prospect that NDS will not attain critical mass before Microsoft Corp. delivers

See Novell, *page 112*

Direct yourself online for more info, including:

- A technical overview of NDS
- A review of Windows NT that compares its directory service unfavorably to NDS
- Microsoft's rebuttal to the review

Enter the number to the right in the DocFinder box on the home page.

5060

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FIRST LOOK

Network computer scorecard: hype 1, reality 0

By Lee Schlesinger

If you expect network computers (NC) to solve your management woes, you may want to think again. And if you expect them to support all the latest features of today's browsers, you've got another thing coming.

Judging by the HDS @workStation we tested, NCs are not plug-and-play dumb terminals. Setting them up requires only a bit of effort. But the real fun begins after installation. For Windows users in particular, NCs are just different enough from real PCs to bring about a raft of support calls, increasing your administration load.

Similarly, while NCs may support Java and ActiveX, you will have to wait for hardware vendors to update their bundled software browsers before you can use state-of-the-art Web features such as frames, Virtual

See NC, *page 12*

HDS' *@workStation*

Java Fund fuels new Web DBMS firm

By John Robinson
Campbell, Calif.

A well-funded start-up here is prepping Java-based tools that promise to make it easier for customers to build database applications on the Web.

Netiva Software, staffed with some former Claris Corp. officials, is expected to release early next year a family of products that will enable customers to build databases on Internet or intranet servers that can be accessed natively by Java-

See Netiva, *page 112*

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Ipsilon strikes back at Cisco

By Jim Duffy
Sunnyvale, Calif.

In a move that analysts said could unshackle customers from Cisco Systems, Inc. and its premium pricing, Ipsilon Networks, Inc. last week said it will add a key piece of Cisco's routing technology to its IP Switching platform.

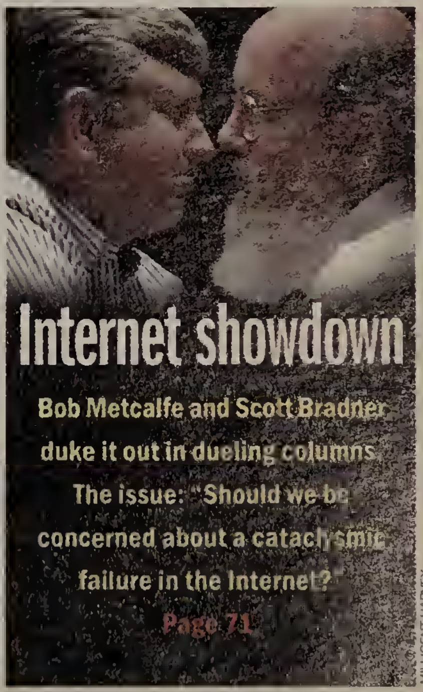
Ipsilon will ship Cisco's proprietary Interior Gateway Routing Protocol (IGRP) technology in its software by year-end. This will enable Ipsilon's IP switches to interoperate better with installed Cisco routers and maybe even displace Cisco gear in some networks. The start-up will also propose an enhanced version of IGRP as an Internet Engineering Task Force (IETF) standard.

While the move is a bold one for Ipsilon, analysts said the real impact of the ploy could come from the company's bigger, better heeled partners, such as Digital Equipment Corp. These companies could use IGRP to drive their products into Cisco's

See Ipsilon, *page 110*

Ipsilon's Larry Blair says his company is ready to challenge Cisco's "monopoly."

Insurer USAA puts premium on Cisco switches in $80m-$120m network overhaul. Page 14.



Internet showdown

Bob Metcalfe and Scott Bradner duke it out in dueling columns. The issue: "Should we be concerned about a catachysmic failure in the Internet?" Page 71

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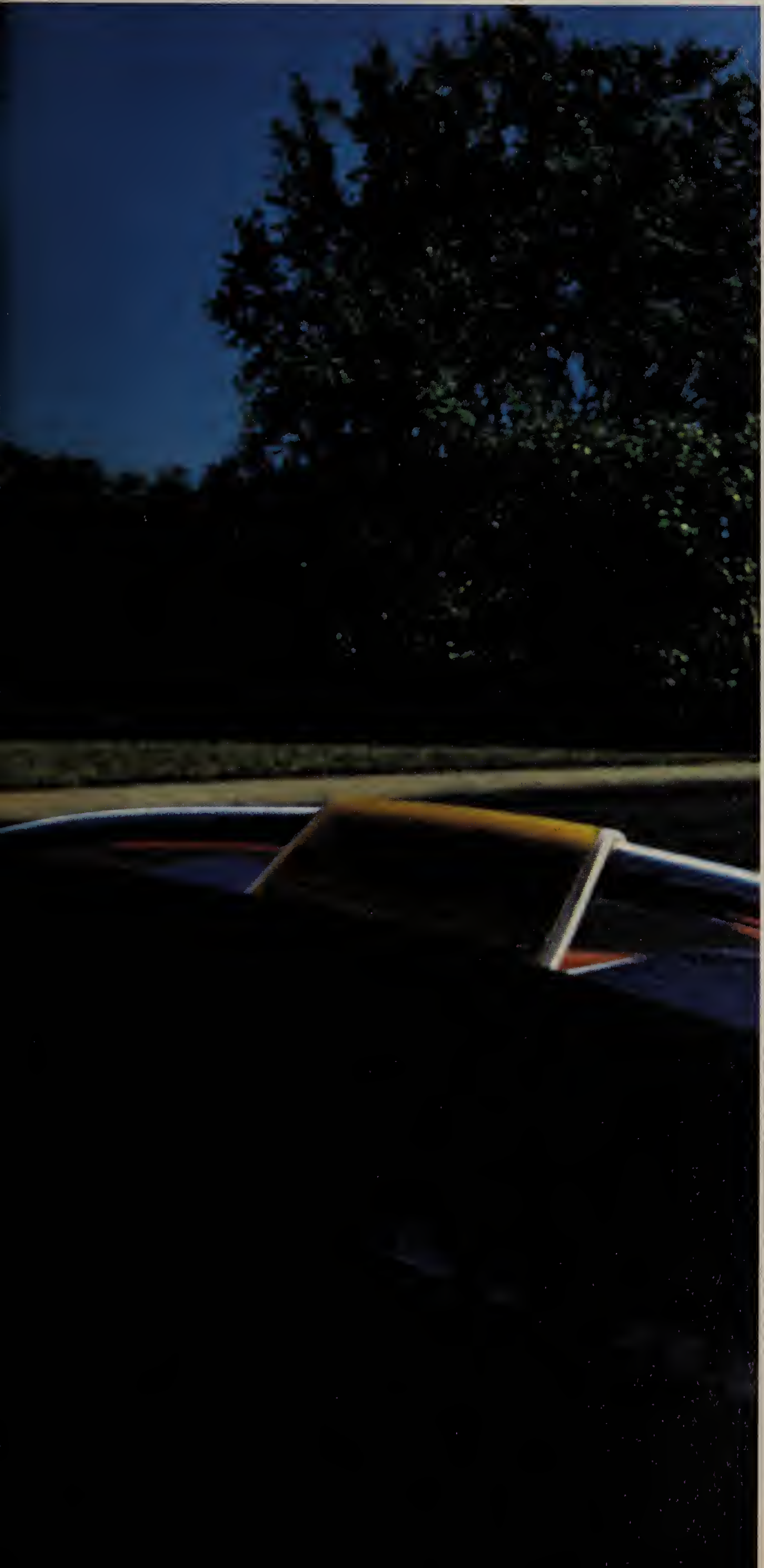

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BOOSTING HTML

Minsky kids, Henry (left) and Juliana, build superset. Page 59.

IBM HOT FOR NCs

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IBM DISSES NETSCAPE

Big Blue claims to have what the 'Net takes. Page 6.

STEVE BORNS

FIND IT ON FUSION

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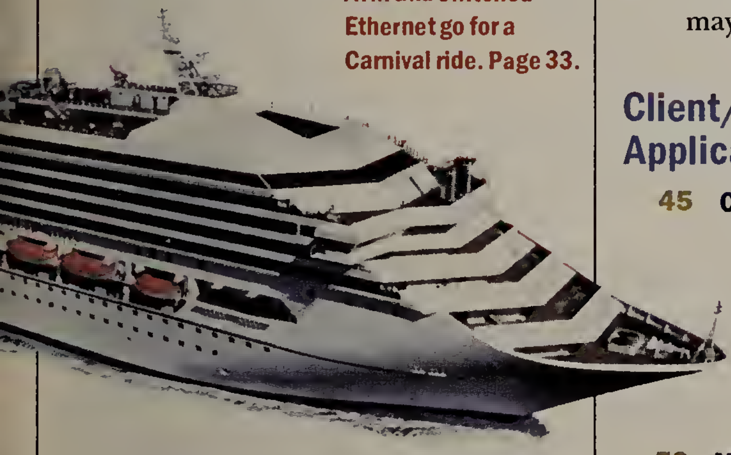

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Review: Enterprise backup products that can win you honors when your users lose data. Page 85.

TROY THOMAS

To quickly get to any online info referenced in *Network World,* type its DocFinder number in the input box on the main page.

This Week

Only on Fusion

- **The Web:** A specification for controlling how spiders index Web sites is proving inadequate; now a group of spider developers hope to spin a new standard that gives Webmasters far greater control over the automated indexing of their sites. **DocFinder: 5063.**
- **Wiring:** First there was twisted-pair. Then glass fiber. And now, plastic? A Massachusetts company has begun building a fiber-optic net out of plastic cables, saying the costs compare favorably to glass over short distances. **DocFinder: 5062.**

News+

- **Internetworking:** Read the complete transcript of our revealing interview with Ron Schmidt, chief technology officer at Bay Networks. **DocFinder: 5059.**
- **Directory services:** Grab a technical overview of Novell's NDS, read a review that finds problems with the competing NT directory, and see Microsoft's comparison of NDS and NT. **DocFinder: 5060.**
- **Internet:** Read the original column in which Bob Metcalfe predicted the end of the Internet as we know it this year. **DocFinder: 5058.**
- **Calendaring:** MIT wants to install a campuswide calendaring system. Link up with its online project documentation, which includes lists of desirable features and vendors and a glossary of calendaring terms. **DocFinder: 5054.**

NetRef

- **Know before you buy:** Download detailed product-comparison charts for remote-access server software. Available in both Word for Windows 6.0 and Adobe Acrobat format. And download remote-access and telecommuting white papers and documents. **DocFinder: 5056.**

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News briefs, November 18, 1996

Ascend-Shiva rumors rock stock

Shiva Corp. and Ascend Communications Corp. were mum last week on rumors that Ascend wants to swallow up Shiva. Shiva's stock, which has been dropping for months, spiked upward from $48.75 to $53.87 last Wednesday based on the rumors. If true, the melding of the two would give Ascend a complete product line from a carrier-class gigarouter down to single-user remote access product with serious inroads to corporations and Internet service providers. There is also speculation that Cisco Systems, Inc. is interested in buying Ascend.

Microsoft to do some hand-holding

The first wave of handheld PCs supporting Microsoft Corp.'s Windows CE operating system will debut this week at Comdex/Fall '96. The devices — from Casio Computer Corp., Compaq Computer Corp., Hewlett-Packard Co., Hitachi, Ltd., LG Electronics, Inc., NEC Corp. and Philips Electronics — sync up with desktop PCs for mobile use and can be fitted with communications hardware. Prices hover around $500.

MCI gets four times faster

MCI Communications Corp. last week announced that it has completed its $60 million initiative to quadruple the speed of its Internet backbone to OC-12, or 622M bit/sec. Some 13,000 ports have been added to accommodate the demand for Internet service on the MCI network.

BT, MCI and Microsoft form united intranet front

British Telecommunications plc, MCI Communications Corp. and Microsoft Corp. plan to offer global intranet services that build on their existing alliances, company officials announced last week. The services — which will tap Microsoft's Exchange Server, Internet Explorer and other applications — will be rolled out through MCI's and BT's existing Concert joint venture. Early next year, it will offer services to customers that want to build and manage their own intranets, as well as to customers that want their intranets managed for them.

IBM pumps up servers

IBM last week announced two major upgrades to its line of symmetric multiprocessing (SMP) servers. The company will upgrade its R and J RS/6000 models to PowerPC 620-based processors. The servers will be scalable to an eight-way SMP system and offer more than twice the performance of the current eight-way R40 SMP system. In addition, IBM is prepping a top-of-the-line 12-way rack-mounted SMP server powered by the Apache processor, which is based on the PowerPC architecture. The new systems will run a revised version of AIX that supports 64- and 32-bit applications.

Xylan sweetens up switches

LAN switch maker Xylan Corp. last week enhanced its OmniSwitch and PizzaSwitch devices with advanced software features, including support for the emerging IEEE 802.1q VLAN trunking standard, translation of Banyan Systems, Inc.VINES frames for different LAN media types and recognition of duplicate media access control addresses. The company also rolled out a six-port token-ring switch module.

OmniSwitch

Netscape pours Java into Windows 3.1 browser

Netscape Communications Corp. last week posted the beta of a 16-bit Navigator 3.01 browser on its Web site. Netscape had long promised Java support in its Windows 3.1 browser, but the engineering work proved difficult, a company spokeswoman said. No word on when the final version is due out. Rival Microsoft Corp. has pledged Java support for its Internet Explorer 3.0 browser on the Windows 3.1 platform by the end of the year. IBM released the first Windows 3.1-based Java Virtual Machine in August.

Defending Lotus Notes, IBM fires shot at groupware newcomer Netscape

By Ellen Messmer and Carol Sliwa

New York

Already besieged by software giant Microsoft Corp., Netscape last week gained a new, even larger arch enemy — IBM.

When Netscape Communications Corp. launched its Communicator groupware client at its October Professional Developers' Conference, the Mountain View, Calif., upstart made no secret that it was taking dead aim at IBM's $3.5 billion baby — Lotus Notes.

Now IBM is firing back by throwing the new Lotus Domino server up against Netscape's SuiteSpot server line and pledging to cut off Netscape's easy access to IBM sales channels.

For more on Big Blue, see pages 14 and 111.

That IBM's sales and systems integration army will no longer play the role of willing merchant of Netscape SuiteSpot servers and tool kits could present problems for Netscape, which counts IBM as one of its bi gest sales channels to corporations.

"IBM will no longer be recommending Netscape products to its customers," said John Patrick, IBM vice president of Internet technology, in an interview with *Network World* following IBM's strategy briefing here.

If IBM's customers want to have Netscape products, IBM will certainly oblige, Patrick said. But no longer will IBM go out of its way to promote Netscape. "If a customer asks, 'What do you recommend?' we'll say Domino and Weblicator."

Weblicator is a plug-in that works with Microsoft's Internet Explorer or Netscape Navigator to get access to Notes databases. The first version of the Domino server, a product that Web-enables proprietary Notes, is set to ship next month.

At IBM's electronic commerce strategy briefing, Jeff Papows, who was recently appointed president of Lotus Development Corp. following Michael Zisman's departure, underscored IBM's new get-tough approach to Netscape.

"According to Marc Andreessen [Netscape senior vice president of technology], the big war in '97 is going to be groupware and E-mail," Papows said, recalling that Andreessen last month flung the groupware gauntlet in IBM's face with its Communicator announcement.

Papows said Lotus Notes is still selling like hotcakes. "We will end the year with a 220% gain, with sales of around 9 million seats," he said. He claimed Netscape lacks the systems integration expertise and the manpower to serve a large corporate base.

STEVEN BORNS

IBM's John Patrick *says Big Blue will "no longer be recommending Netscape products to its customers."*

While declining to release specific figures, Netscape spokeswoman Andrea Cook acknowledged that IBM was one of the top sales channels for Netscape's SuiteSpot products, along with Hewlett-Packard Co.

"IBM is a very strong partner of ours," Cook said.

She described the IBM/Netscape relationship as a "classic example of 'coopetition,'" whereby companies cooperate on some levels and compete on others.

"This is very common for Internet companies, where the work is getting defined and who knows who's going to win. We're all trying to figure out where we're going to compete," Cook said.

Some Lotus executives last week said they were sad to see the Netscape/IBM alliance sour. ■

IBM showcases EC products, customers

Hugging the spotlight last week in the name of electronic commerce, IBM and Lotus Development Corp. executives, accompanied by a few IBM business customers, played up the drama of Internet applications.

Gideon Sasson, senior vice president at Charles Schwab & Company, Inc., gave IBM the credit for building the brokerage firm's new e.Schwab online trading system that lets investors place trades over the Web and check account information available through back-end CICS databases.

"We now have 15% of our trades through the Internet," Sasson said.

And Todd Miller, president of KR SourceOne, Knight-Ridder Information, Inc.'s document-ordering service, sang the praises of his new Notes-based order-management system, also based on Lotus Development Corp.'s Domino server.

"Since we implemented the system, our cost of goods sold has decreased by 50%," Miller proclaimed to the audience largely composed of reporters.

"The Internet is merging with the IT infrastructure," said Irving Wladawsky-Berger, general manager of IBM's Internet division, who, along with other IBM executives, showcased Internet-based vertical market applications for the insurance, auto financing, petroleum and utilities industries, as well as the National Hockey League.

John Patrick, IBM vice president of Internet technology, topped the afternoon with a stunning visual presentation of a three-dimensional virtual reality Web site IBM is doing for the Paris store Gallerie Lafayette.

The 3-D technology lets the user navigate the store, and purchase items and clothing on display or those modeled by digital, animated icons known as "sprites."

Patrick said the experimental technology, called PanoramIX, extends digital camera images into 3-D environments. IBM is now putting such technologies online (alphaWorks.ibm.com), in hopes of getting public feedback on how the technologies can be used or improved.

— *Ellen Messmer*

THE INTELLIGENT WORKPLACE
CARNEGIE MELLON UNIVERSITY
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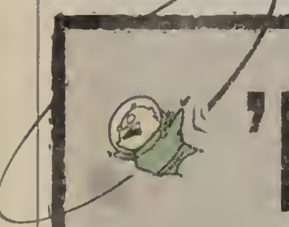

'NET BUZZ

The latest on the Internet/intranet industry.

Compiled by Chris Nerney

IT DOES THE WORK, YOU TAKE THE CREDIT It's a Webmaster's biggest fear: A small, undetectable problem that eventually leads to a massive system crash, a sudden escort out of the office and a renewed acquaintance with Ramen Pride.

Now Internet start-up Freshwater Software, Inc. (FSI) of Boulder, Colo., has come out with a product that company officials say could ensure the gainful employment and gastronomic integrity of Web administrators everywhere.

SiteScope is designed to monitor the performance of critical intranet components, including URLs, Web servers and disk space. At the first sign of trouble, Freshwater officials say, SiteScope alerts the Webmaster. FSI says that SiteScope even can launch automated recovery scripts.

SiteScope pricing starts at $1,295 for Unix and $495 for NT.

LIVE FROM CYBERSPACE Look for start-up Pipe Dream, Inc. to release software by year-end that the company says will permit television-like broadcasting via the Internet.

The software, Simulcast, is designed to let subscribers access a directory and connect 24 hours a day with live programming, including video, audio and text. The Internet Broadcasting Technology upon which Simulcast is based allows information to go directly from the broadcasting machine to subscribers via the Internet, according to Pipe Dream President Jacky Benmoha.

Pricing has not been set. And while pipe dreams can be found everywhere, this Pipe Dream is located in West Palm Beach, Fla.

BACK AT THE IPO ALTAR Earthlink Network, Inc. is taking another stab at an initial public offering (IPO).

The Pasadena, Calif.-based national Internet service provider was set to go public over the summer, but when the market for Internet stocks melted down in July, Earthlink opted against adding to the carnage and bailed out.

However, Earthlink filed again for an IPO on Nov. 8. Some analysts may question such a move – after all, Earthlink is no closer to showing a profit now than it was a few months ago – but Robert Nicholson of Spectrum Equity Investors, L.P. in Boston said competitive pressures are forcing Earthlink's hand.

"They don't have a choice," Nicholson said. "They have to do something to attract additional capital because only the strong are going to survive in the ISP market."

CALLING FOR IP TELEPHONY STANDARDS A coalition of 40 Internet- and network-related companies met in Dallas last week to begin pushing for a set of standards that would make Internet telephony products compatible.

The Voice over IP (VoIP) Forum includes such heavyweights as Microsoft Corp., Cisco Systems, Inc., 3Com Corp. and U.S. Robotics, as well as Internet telephony pioneer VocalTec, Inc.

Members of the VoIP Forum hope that compatibility standards will accelerate the growth of telephony over the Internet and corporate intranets, as well as bridging to the public telephone network.

Got a scoop that will rock the Internet/intranet world? Spill your guts to Chris Nerney at (508) 820-7451 or cnerney@nww.com.

AT&T services to pave SNA-to-frame relay path

Managed services convert legacy protocols to frame relay.

By David Rohde
Basking Ridge, N.J.

AT&T last week marched into the path of competitors hungry to raid its private-line installed base by announcing two managed services designed to ease SNA customers' migration to frame relay.

The services are based on AT&T-installed frame relay access devices (FRAD), which assemble packets from legacy SNA and bisynchronous protocols into data frames suitable for frame relay transport.

In the new AT&T Frame Relay Central Office FRAD Option, users can ship legacy traffic to an AT&T point of presence (POP), where the carrier will perform the protocol conversion using FRADs from NetLink, Inc. With the other new service — dubbed the AT&T Managed FRAD Solution — the carrier will install Motorola, Inc. FRADs on the customer premises to consolidate legacy and LAN-to-LAN traffic onto a frame relay WAN.

Industry observers have been anticipating the announcement of the AT&T Managed FRAD service for the customer premises for at least a year as a signal that SNA-to-frame relay migration is truly getting under way.

The AT&T service lags those of competitors — Sprint Corp. announced a managed FRAD offering almost a year and a half ago (see graphic) — but is significant because AT&T's private-line installed base dwarfs those of competitors. Also, companies such as Sprint are expected to make a grab for the AT&T private-line users that want to save money with frame relay through its upcoming SNA Advantage Program (*NW*, Nov. 4, page 1).

And with its central office FRAD announcement, AT&T becomes the first major carrier to deliver a service that lets SNA users send traffic to the POP in native Synchronous Data Link Control format for the carrier to make the protocol conversion.

MCI Communications Corp. announced a native SDLC conversion frame relay program at the beginning of the year. "But MCI has not been able to deliver a commercially available service," said Liza Henderson, a broadband analyst for TeleChoice, Inc. in Verona, N.J. Henderson cited carriers' difficulty in obtaining in-house SNA expertise as a reason why major carriers have not delivered such a service until now.

The new AT&T services also fill out the carrier's managed services product line, in which AT&T provides transport as well as configuration and monitoring of customer premises equipment from the WAN side outward. The Managed FRAD service will act as an alternative to a service known as AccuWAN — which supports routers from Bay Networks, Inc., Cisco Systems, Inc. and 3Com Corp.

AT&T officials did not reveal pricing for any of the managed services, but the carrier acknowledged that they would cost significantly more than transport alone. ■

WHO GOES WITH WHOM

The Big Three carriers have all entered the managed frame relay access device (FRAD) sweepstakes with the following vendors' equipment:

Carrier	Date program announced	Vendor for central office FRAD service	Vendor for CPE-based managed FRAD service
AT&T	November 1996	NetLink	Motorola
MCI	January 1996	Unspecified*	Sync Research
Sprint Corp.	September 1995	None	Sync Research

* Not commercially available yet.

GEIS customers knocked off 'Net

By Todd Wallack
Rockville, Md.

Thousands of customers lost access to the Internet, all over a measly hundred bucks. GE Information Services (GEIS) last week acknowledged that it failed to properly renew its Internet domain name — knocking its users off the Internet for more than 24 hours.

Apparently, GEIS forgot to pay the $100 fee to renew the geis.com domain on time. Last Monday afternoon, Network Solutions, Inc., which runs the InterNIC domain registration service, deleted geis.com from its database. With no mention in the Domain Name Service, GEIS users were unable to send or receive Internet mail, and the company's Web site disappeared from the global network.

GEIS is one of the nation's largest X.400 and electronic data interchange networking concerns, with $700 million in annual sales.

"We had an internal process breakdown," said GEIS spokesman John Berry. He would not elaborate but said the company has established a centralized process for registering domain names to make sure the problem does not recur.

The snafu likely had far-reaching effects. GEIS is one of the nation's largest X.400 and electronic data interchange networking concerns, with $700 million in annual sales. Many of the 40,000 companies GEIS works with — including *Network World* parent International Data Group — could not send outside E-mail through the network until the problem was corrected.

It is also bad timing, coming just a week after GEIS touted its new Internet consulting and services practice in a press re-lease. GEIS claimed: "We can show businesses how to use the Internet and emerging technologies for bottom-line results."

But Berry downplayed the damage. He said only a handful of users reported problems through the company's toll-free number.

Ironically, some users may have had trouble reaching the company by phone. AT&T Directory Services repeatedly gave out a number for GEIS headquarters that just rings and rings. Berry said the phone company has the correct number but often gives out another.

"From time to time, they get their wires crossed," Berry said. ■

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N/WAN SOLUTIONS NETWORK MANAGEMENT ATM SOLUTIONS FDD

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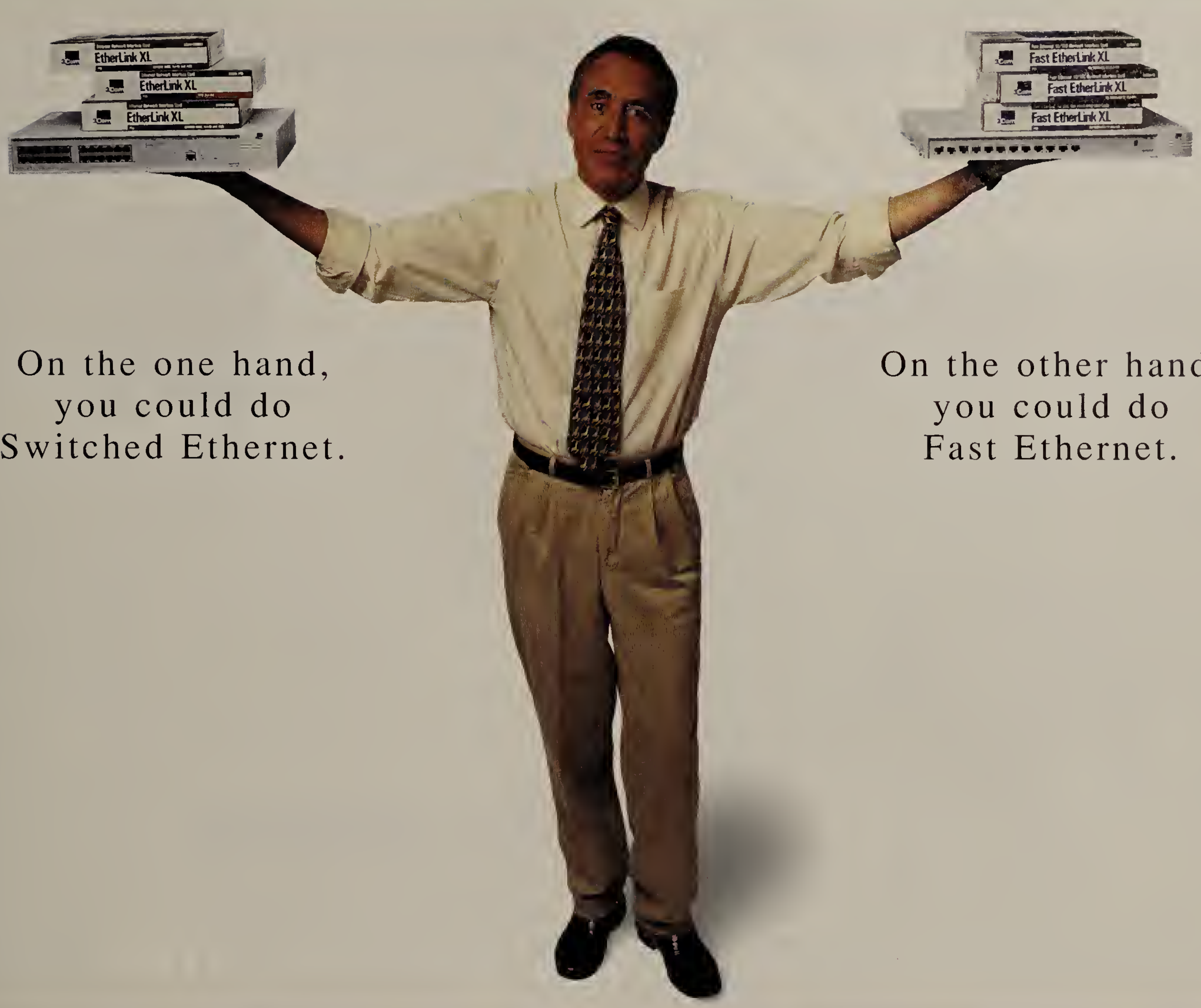

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Hewlett-Packard joins the Internet race

Company unveils hardware and software packages; network computers are on the way.

By Carol Sliwa
Palo Alto, Calif.

In the race to grab a piece of the Internet market, Hewlett-Packard Co. didn't exactly leap out of the blocks.

But last week, the company, based here, did finally commence its first serious launch of hardware and software packages to help small and large businesses get on the 'Net.

And by year-end, HP also hopes to announce its venture into the network computer (NC) arena, according to Jan Silverman, the company's director of Internet business development.

HP's *Silverman says his firm is working on offerings ranging from diskless NCs to stripped-down PCs.*

Silverman said two HP divisions are working on a variety of hardware offerings, ranging from the sort of diskless NCs that Oracle Corp. and Sun Microsystems, Inc. have been promoting to the stripped-down PCs that Microsoft Corp. has been talking about. Also, he said the company is working on handheld devices and set-top boxes with built-in Web browsers.

In the meantime, HP last week began following through on commitments initially discussed in late spring.

Quite a project

HP this week will introduce SoftBench Project: GV, a code name for its Web-enabled project and process management offering for application developers. The offering includes document management and archiving components that are accessible via the Web.

The company has dubbed its new Internet wares the HP Domain product line. It includes:

■ The Domain Business Suite, a package that integrates server software based on HP's OpenView management system, OpenMail client/server messaging software (with 100 end-user licenses) and Netscape Communications Corp.'s SuiteSpot line, which includes five servers. The HP suite sells for $3,995, the same price Netscape charges for its SuiteSpot server package. Netscape's new Communicator groupware client will be able to run with the suite.

■ Domain Enterprise Server family, which packages HP's Unix-based server hardware with the Domain Business Suite. Prices for five different servers with preloaded software are $9,500 for the 715, $14,000 for the D210, $35,000 for the D350, $44,000 for the K220, and $85,000 for the K460.

■ NetServer Web Master, Windows NT-based PC server hardware that lets companies or internal corporate departments with 200 or fewer users get on the 'Net in less than an hour.

The package features new wizard-oriented software to help users set up Web sites; a new firewall product and management console software from Intel Corp.; a Cisco router; Microsoft's Internet Information Server 2.0, FrontPage Web authoring tool (which comes bundled with NT 4.0) and Internet Explorer 3.0 browser; and a mail program from Ipswitch, Inc. Web Master will be available Jan. 1 priced at $9,999.

"HP is a very conservative company. They have taken their time and measured their strategy carefully," said Peter Lowber, a senior analyst with Datapro Information Services in Delran, N.J.

"Undoubtedly, they've lost a lot of the Internet mind share and some Internet accounts to Sun Microsystems," Lowber added. "But, on the other hand, don't underestimate HP. They've been doing a lot of work, and they will be a force to be reckoned with."

HP isn't really going after the two big names most closely associated with the Internet wars.

Rather, the company is integrating Netscape products at the enterprise level because it can't use Microsoft software on Unix, and is bundling in Microsoft products at the low end.

"With all the confusion in the marketplace, companies are looking for one vendor to put it all together," said Allen Bonde, director of Internet computing strategies for the Boston-based Yankee Group.

"People know HP for a lot of things, but not necessarily as an Internet solution provider. Right now, their main challenge isn't technology; it's marketing," Bonde said.

HP is positioning itself as a complete solution provider, with IBM as a key competitor in that space, Bonde said. "Having one vendor that has the pieces and understands how to put them together is very attractive," he said.

"They're not too late to market," said Ira Machefsky, an analyst with Giga Information Group. "People need a package to get a quick Internet start."

Program launch

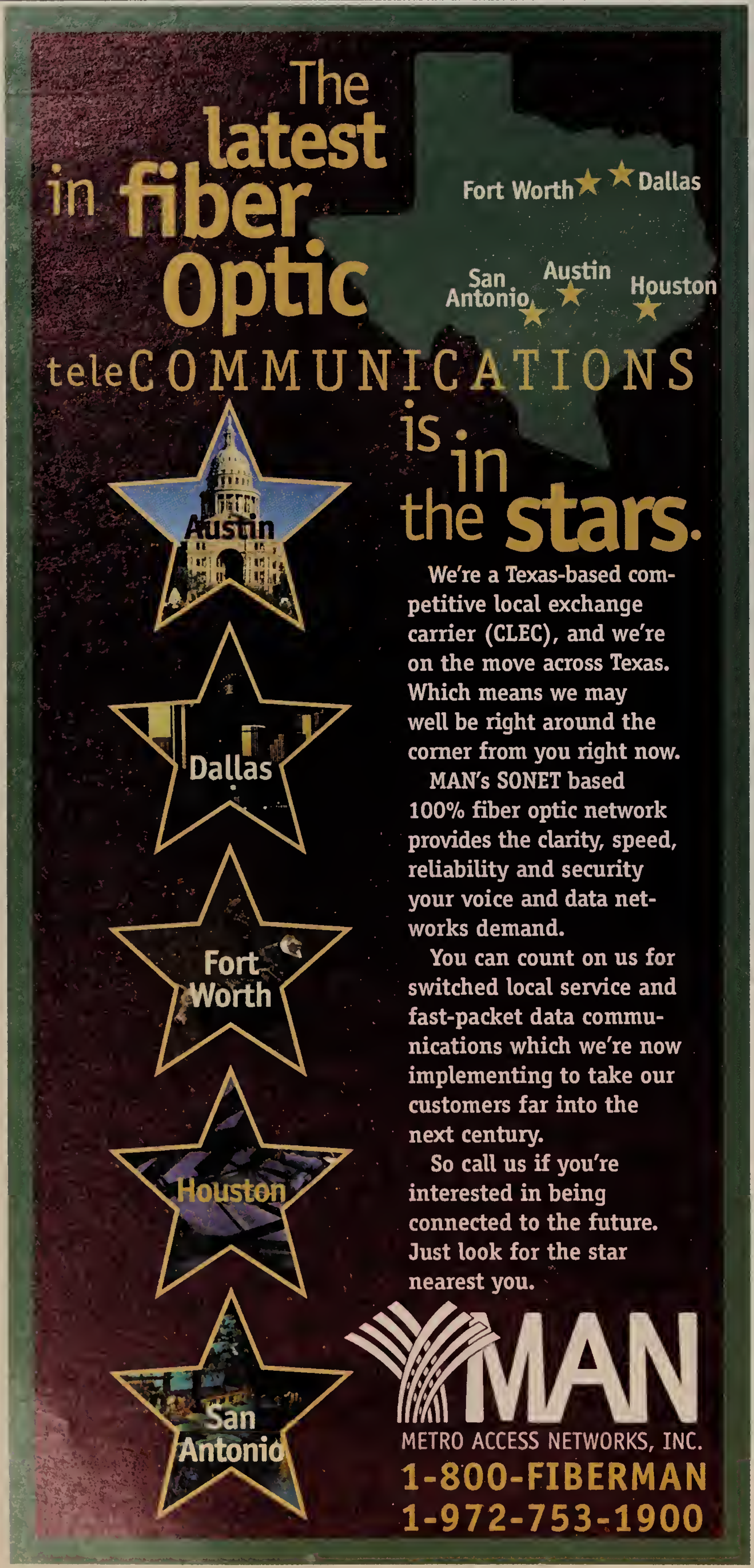
In related announcements, HP launched its Domain Partner Program, which offers discount and financing options, and promoted a channel program to enable HP resellers to expand Internet offerings to businesses.

HP also announced that it will become a worldwide support provider for Netscape and offer training courses on Netscape's servers beginning in December.

✆HP: (800) 637-7740.

CORRECTION

In a recent story (*NW*, Nov. 4), it was incorrectly stated that Broderbund Software Corp. was beta-testing Keynote Systems, Inc.'s new service. Broderbund only participated in a Keynote focus group held earlier this year.



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FIRST LOOK

NC

Continued from page 1

Reality Modeling Language (VRML) and anything that requires a plug-in application.

We looked at HDS Network Systems, Inc.'s @workStation, an NC based on Intel Corp.'s i960 processor and designed for corporate offices. The computer itself is housed in a 12-by-2-inch tabletop unit with net, serial, parallel, keyboard, mouse and video connectors on the back. The monitor is a relabeled Digital Equipment Corp. 17-inch tube. The unit also sports a PC Card slot, into which we inserted an HDS-supplied, 40M-byte PC Card hard drive that contain-ed a beta version of netOS 2.0, HDS's NC operating system. For computers without the hard drive, you can install netOS to a server directory and boot from the server.

The @workStation is capable of browsing the World-Wide Web, and can run applications on a separate networked server in much the same manner as X terminals. In fact, the @workStation can function as an X terminal with a Unix host. To use it this way or as a browser, you must first specify a TCP/IP address and gateway from the setup menu.

Network World TEST ALLIANCE

The interface of the @workStation will be familiar to anyone comfortable with Windows 95, but there are some significant differences.

Instead of a "Start" button, an "@work" button at the top of the screen offers users the option of starting sessions with Explorer — the built-in Web browser (not Microsoft's); Insignia Solutions, Inc.'s NTrigue, a Windows NT host access program; or a terminal session to connect to a Unix host. You can run other bundled applications or change settings from the @work button, as well.

We tried running the Explorer browser against a variety of Web pages, such as those with Java and ActiveX features. Against simple pages it worked fine — although extremely slowly. The browser choked on more complex objects, such as animated GIFs and frames, and failed to run objects that required plug-ins, such as VRML. Explorer ran Java code fine — though not JavaScript — but at a speed that, had we not been unusually patient, might have caused us to throw down our mouse in disgust.

If we had our druthers, we would run Netscape Communications Corp.'s Navigator from the host rather than HDS's Explorer browser. Explorer, based on code licensed from Spyglass, Inc., has a similar look and feel to Navigator 1.0. But, in our tests, it was slower than Navigator in retrieving and reloading pages.

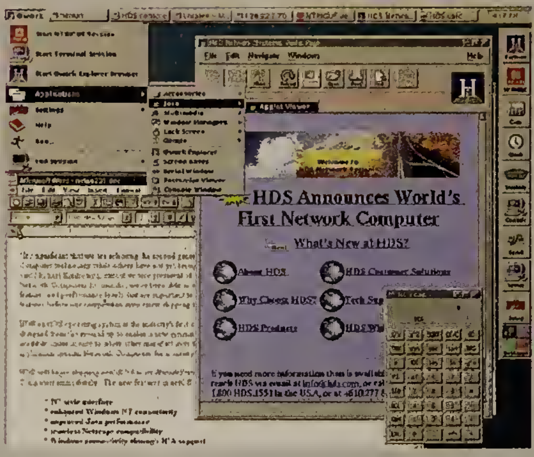
HDS has just announced a licensing agreement with Netscape, so improvements in the browser are on tap for future versions. Along the right side of the @workStation screen is a toolbar with icons to start an Explorer or NTrigue session, invoke the calculator, the clock, console and telnet programs, as well as Check and Change settings.

Among the settings you can change is the Window manager. This box has multiple personalities — three window managers that make the interface appear as if it were Windows 95, Motif or Open Look. Each is functionally equivalent, but the flexibility can make different kinds of users feel at home.

Not so simple, really

Windows support comes thanks to NTrigue. The NTrigue host is a version of Windows NT 3.51, modified to support Citrix Systems, Inc.'s Intelligent Console Architecture. The server software replaces the operating system on the host. The drawback is you cannot yet upgrade to Windows NT 4.0. An NTrigue client lives on the NC. You to connect to the host and use any resident applications.

When you start NTrigue, a login screen prompts for username, password and a host to validate them. The NTrigue client doesn't automatically know the available hosts on the network, so you must enter the IP address of a valid host the first time you connect. This may be enough to alienate some users. What alienated us was that the @workStation failed to connect more often than it succeeded. Sometimes it worked, sometimes it didn't, and crossing our fingers seemed to have no effect at all.



HDS' *network computer looks like a real PC but isn't.*

Once we connected successfully, we were able to run host applications with ease.

The NTrigue client interface resembles that of Windows 95 (despite the fact that the host is running Windows NT 3.51), but it does not work just like Windows 95. Most irritatingly, there is the question of window focus. Under Windows 95, a highlighted title bar indicates an active window. That is not always the case with the @workStation. If you have just exited another application, you return to a window with a highlighted title bar, but the window doesn't return to active focus until you click in it. Numerous times, we began typing in an application, only to have our keystrokes ignored until we repositioned the mouse and clicked in a window or a field.

The problems we had with the @workStation were compounded by the sparseness and quality of the documentation. The user manual is poorly organized and, at less than 100 pages long, is not comprehensive enough — and we don't say that just because pages 17 and 19 were missing. HDS's technical support helps make up for the documentation's deficiencies; on our calls, the technical support staff was patient, courteous and knowledgeable.

Fitting in

After a week of using the @workStation, we concluded that an NC is appropriate for two kinds of organizations — those with highly centralized management that want total control over the applications their users run, and those that envision diminishing capital budgets and aim to minimize their hardware upgrade costs down the road.

The initial investment in an @workStation is out of line with current PCs. The model we tested, with 32M bytes of memory, lists for $1,799. For the same price, you could get a speedy Pentium with comparable memory, a smaller monitor and a gigabyte of hard drive space. The lowest end @workStation, with 8M bytes of RAM and a gray-scale monitor, lists for $749.

Theoretically, it is not the initial investment that makes an NC a reasonable choice. Because it can run applications on state-of-the-art workstations elsewhere on the network, the NC has a longer useful life than the three years or so of a typical network client. Instead of upgrading all users, you simply upgrade the hosts from which they run applications.

In practice, the support costs for this first-generation product should quickly eat up any onetime cost savings. Until vendors work out the kinks in NCs, we'll stick with more traditional technology. ■

www.microsoft.com/office/97/fewer1s

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Bay exec: Switching may be hype

Rushing out to replace that shared-media hub with a switch? Read these candid assessments from Bay Networks, Inc. Chief Technology Officer Ron Schmidt first. Schmidt shared his frank thoughts with *Network World* Senior Editor Jim Duffy.

Do you see the multimedia infrastructure we're all heading toward being cell-based or packet-based?

Probably a little bit of both. At the desktop, I am hard-pressed to see any reason to go cell-based. From a technology point of view, I'm convinced you can do it with packets as well as cells.

Once you get into the backbone of the network and the wide area, then it's a different issue. A lot will depend on the influence of the carriers and the telco-related influences vs. technological capitalism, for lack of a better term.

Everything that I've seen [let's you] do the quality of service, and voice and video and all those sorts of things with the frame-based networks, at least in the desktop.

So you see the roles of IP and ATM being equally responsible in delivering this QoS-based network?

Well, somewhere ATM is going to play because the forces from the telephony side coming in from the wide area are going to push that in there. Given all the LAN-heads, they wouldn't really go for ATM because there's all this other real-time Internet model. Somewhere that stuff's going to hit a wall. The issues, I don't think, are so much technical as they are installed base, history, religion — perhaps, what you are comfortable with.

Do you see the day when ATM will eliminate IP?

ATM is a Layer 2 technology, IP is a Layer 3 technology. I think the question is, will there be a different paradigm that doesn't use IP? I think I'll be retired by the time that comes.

Bay's *Schmidt says, "Switching doesn't help performance."*

What, in your view, is holding back the market for ATM? Why hasn't the market for ATM taken off yet?

I think everyone underestimated the complexity of it. Sometimes in our industry the marketing gets way ahead of the technology.

The thing that I find incredibly interesting is that switching doesn't really help performance. What switching does is allow you to manage congestion, especially if you have high average throughput. If you compare 100M bit/sec shared Ethernet in a client/server environment to switched 10 with a 100M bit/sec pipe into the server, you'll find if you have really high-performance workstations the shared 100 gives you better performance than the switched 10, and the marketplace doesn't understand this yet.

When you do the performance tests, you see it's like a factor of three or four improvement.

What the switch does for you is remove congestion. But with most of your client/server applications, the network's not congested. So a lot of it is just hype.

Some analysts say the Web and the Internet are the killer applications for ATM, but others say they are the killer applications for IP that keep postponing ATM.

There are two schools of thought. Again, it depends on whether you come from the telephony background. If you have an ISP that's telephony-centric, they clearly want the ATM because they see the scalability and manageability and all this sort of stuff as part of their infrastructure. If you have an ISP that comes from the Internet bit-head backbone, they say 'I don't want all this complex ATM. I just want a big pipe, and I don't want any excess cell overhead and stuff like that.' I don't even think this is an issue; I think this is a religious preference and a familiarity issue.

But I wouldn't compare IP to ATM. I see IP running over ATM. Routers may be in the campus, then ATM [switches would be in] the wide area. You could even do it with TDM, you could do the QoS stuff.

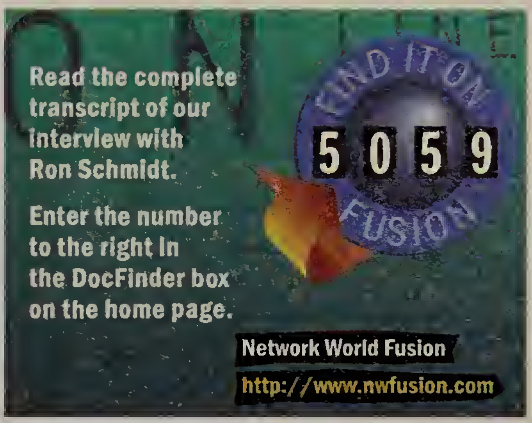
Why is there this debate then in the industry as to whether...

I don't know. It might be a fabrication of the marketing departments and the press.

One of the arguments that people with the Internet background tend to use is ATM is this top-down, end-to-end service; you've got to create a connection, and that's a lot more complicated than the Internet model.

This isn't the perfect analogy, but the analogy is sort of the same as SNMP and CMIP. CMIP was this top-down architected thing, and it was so cumbersome you could never do it. It was overarchitected. SNMP sort of evolved into it. It's an evolutionary approach. And then people started improving it. It never got to CMIP.

I think IP's going to deliver incremental improvements in quality of service. By the time it delivers quality of service comparable to ATM, ATM will be there. ■



Read the complete transcript of our interview with Ron Schmidt.

Enter the number to the right in the DocFinder box on the home page.

5059

Network World Fusion
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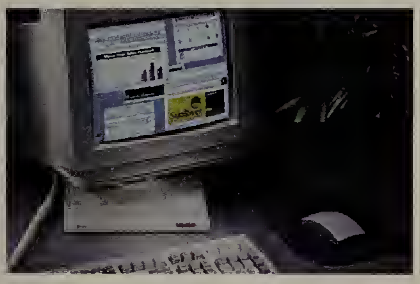
NCs to grab Comdex spotlight

Several companies are demonstrating network computers (NC) at Comdex/Fall '96 in Las Vegas this week. They include:

■ **Boundless Technologies, Inc.,** formerly SunRiver Data Systems, which introduced a line of NCs in August.

■ **Corel Corp.,** which plans to ship a Java-enabled NC early next year. The NC boasts a Motorola, Inc. PowerPC engine and can be used for applications such as videoconferencing and Corel Office for Java.



Boundless Technologies' *network computer will be demonstrated at Comdex.*

■ **IBM and Network Computing Devices, Inc.,** which are partnering to manufacture and market IBM's Network Station. IBM last week announced creation of its Network Computer Division (see story, page 17).

■ **IDEA,** whose IDEA Internet Client Station is based on the NC standard developed by Oracle Corp., Sun Microsystems, Inc. and others, and is geared toward business customers.

■ **Sun Microsystems, Inc.,** which is offering the JavaStation, an NC that offers users a diskless computer, a keyboard, a mouse and a 14-inch color monitor.

■ **Wyse Technology, Inc.,** which will unveil a line of enhanced NCs powered by Pentium-class SA-110 processors from Digital Equipment Corp. and run Java applications. The Winterm 4000 line is geared primarily toward corporate intranet use and is being touted by Wyse as comprising the fastest NCs on the market. Wyse also will discuss plans for a mobile NC. ■

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USAA saying good-bye to SNA, hello to switching

Cisco switches to play big role in insurance company's $80 million to $120 million data network overhaul.

By Jim Duffy
San Antonio, Texas

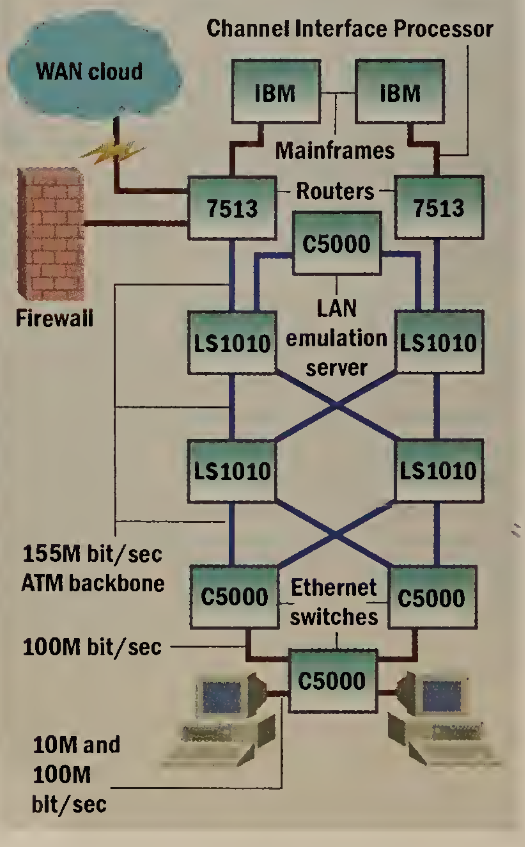
Insurance and financial services giant USAA will not renew its SNA policy.

The company is embarking on a massive overhaul of its regional data network to the tune of $80 million to $120 million. USAA is ripping out hundreds of token rings and a handful of IBM front-end processors (FEP), replacing them with Ethernet and ATM switches, virtual LANs and channel-attached routers from Cisco Systems, Inc.

The project, dubbed the Information Highway Program (IHP), will enable USAA to process claims and deliver services faster by providing a network infrastructure that can better support multimedia applications, said Sally Grant, USAA assistant vice president of network development and sustainment. It will also enable the company to manage the movement of end users among multiple workgroups, she added.

SWITCHING GEARS

USAA is replacing its SNA infrastructure with a switched Ethernet and ATM backbone supporting virtual LANs. Cisco 7513 routers will displace IBM front-end processors.



According to Grant, IHP is slated for completion in late 1998.

"This is a major change for us," she said. "Our token-ring network was put in when we put in our image system back in the late 1980s. It served us extremely well for the type of host-based processing we were doing at that time."

But SNA was not keeping pace with USAA's increased usage of client/server applications, object-oriented technology and multimedia programs, she said.

Gone will be 500 shared-media, source-route bridged token rings connecting 25,000 endstations and 500 servers to the data center here. In their place will be switched 10M and 100M bit/sec Ethernet to desktops and servers, and workgroups connected to each other and to the data center via 155M bit/sec ATM links.

USAA PUBLIC RELATIONS

USAA's *Grant says VLANs will provide more flexibility.*

Most of the new network's traffic will be based on TCP/IP and IBM's Advanced Peer-to-Peer Networking protocols. APPN will foster peer-type communications between IBM mainframes and Application System/400 servers, while TCP/IP will be used to communicate with non-IBM hosts.

The number of servers will double to 1,000 under the project, Grant said.

USAA opted for switched Ethernet to the desktop instead of switched token ring or ATM, due to market momentum, Grant said.

"We didn't see [ATM] to the desktop because it appeared that was not moving

See **USAA,** ***page 111***

IBM in Sync on frame relay devices

By Michael Cooney
Irvine, Calif.

It looks like IBM will get its hands on a whole new FRAD.

IBM and Sync Research, Inc. are soon expected to expand their OEM agreement to include the Sync FrameNode 3600, a new more powerful frame relay access device (FRAD) with frame circuit management capabilities.

The FrameNode 3600 will give large SNA users moving to frame relay backbones complete visibility of their frame circuits and let them diagnose the health of their frame network faster.

The new FRAD will likely become part of IBM's 2218 Nways family, which is based on Sync's 4200 FrameNode product. IBM did not comment on the new FRAD, although Sync executives said IBM was already bidding the box to new accounts. IBM and Sync have had an OEM relationship since March.

The new FRAD comes at a time of housecleaning for IBM, which last week announced it would discontinue selling older Sync FrameNode products, namely Models 100, 200 and 400, in favor of the 2218. Sync already migrates its own users to the 4200.

"IBM never private-labeled those products like they do the 2218, but users can continue to get support for them from us or IBM," said Todd Krautkremer, vice president of marketing for Sync.

The FrameNode 3600 will include an integrated DSU/CSU, as well as token-ring and Ethernet LAN support. More significantly, however, it will include the circuit management software Sync picked up earlier this year from Tylink Corp.

That technology will let users obtain data such as errors, throughput, congestion and frame relay flow conditions on individual circuits. A Performance Manager application for the FRAD will run on Hewlett-Packard Co.'s OpenView or Sun Microsystems, Inc.'s SunNet Manager. A version for IBM's Tivoli TME 10 package is expected next year, Krautkremer said.

Shipment dates and pricing for the new FRAD were not revealed.

©Sync: (714) 588-2070.

IBM spruces up low-end server line

By John Robinson
Somers, N.Y.

IBM last week fired up its low-end server line with a new Pentium Pro machine, systems management hardware and a souped-up installation program.

The PC Server 325 comes with a 200-MHz Pentium Pro processor and 256K bytes or 512K bytes of Level 2 cache. It sports one PCI slot, one EISA slot and four shared PCI/EISA slots. It also features up to 13.5G bytes of storage.

With prices starting at around $5,000, IBM hopes to attract customers looking to interconnect departmental file servers, database servers or Internet servers running E-mail or word processing applications.

IBM also unwrapped the PC Server Advanced Systems Management Adapter card. In conjunction with the company's TME 10 NetFinity software, the card lets administrators monitor and manage servers remotely. Administrators dialing in to the card via a modem can reset the server, check temperatures or control system power.

Lastly, the company announced a new version of its ServerGuide configuration software for IBM servers. The CD-based tools guide administrators through the installation process, hardware configuration and software installation.

The PC Server Management Adapter will be available this month starting at $460. ServerGuide and TME 10 NetFinity ships with all IBM servers.

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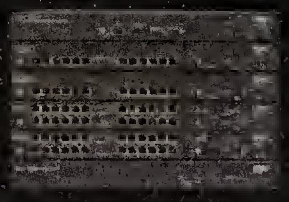

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1 Industry: (check one only)

01. ☐ Manufacturers (other)
02. ☐ Finance/Banking
03. ☐ Insurance/Real Estate/Legal
04. ☐ Health Care Services
05. ☐ Hospitality/Entertainment/Recreation
06. ☐ Media/TV/Cable/Radio/Print
07. ☐ Retail/Wholesale Trade/Business Services
08. ☐ Transportation
09. ☐ Utilities
10. ☐ Education
11. ☐ Process Industries (Mining/Construction/Petroleum Refining/Agriculture/Forestry)
12. ☐ Government (Federal/State/Local)
13. ☐ Military
14. ☐ Aerospace
15. ☐ Consultants (Independent)
16. ☐ Carriers/Interconnects
17. ☐ Manufacturers (Computer/Communications)
18. ☐ Resellers of Computer/Network Products (VARs, VADs)
19. ☐ Systems/Network Integrators
20. ☐ Distributors (Computer/Communications)
21. ☐ Other *(please specify)*____________

2 What is your job function? (check one only)

NETWORK IS MANAGEMENT:

1. ☐ Networking Management
2. ☐ LAN Management
3. ☐ Datacom/Telecom Management
4. ☐ IS, IT, MIS, Systems Management
5. ☐ Engineering Management
6. ☐ Corporate Management (CIO, CEO, Pres., VP, Dir., Mgr., Financial Management)
7. ☐ Consultant (Independent)
8. ☐ Other *(please specify)*____________

3 What is the estimated value of networking equipment and services that you help specify, recommend or approve? (check one only)

01. ☐ $100 million or more
02. ☐ $50 mil. - $99.9 mil.
03. ☐ $25 mil. - $49.9 mil.
04. ☐ $20 mil. - $24.9 mil.
05. ☐ $10 mil. - $19.9 mil.
06. ☐ $5 mil. - $9.9 mil.
07. ☐ $1 mil. - $4.9 mil.
08. ☐ $500,000 - $999,999
09. ☐ $250,000 - $499,999
10. ☐ $100,000 - $249,999
11. ☐ None of the above

4 What is the total number of sites for which you have purchase influence?

(check one only)

1. ☐ 100+
2. ☐ 50 - 99
3. ☐ 20 - 49
4. ☐ 10 - 19
5. ☐ 2 - 9
6. ☐ 1
7. ☐ None

5 Are you involved in the purchase of and/or plan to purchase network products and services?

☐ Yes ☐ No

6 Check ALL that apply in Columns A and B:

A. I am involved in the purchase of the following prodncts/services:
B. I plan to purchase the following prodncts/services:

LOCAL-AREA NETWORKS
A B
☐ 01. ☐ Local-Area Networks
☐ 02. ☐ Network Op. Sys. Software
☐ 03. ☐ LAN Storage/Backup
☐ 04. ☐ Optical LAN Storage/Backup
☐ 05. ☐ Disk LAN Storage/Backup
☐ 06. ☐ Tape LAN Storage/Backup
☐ 07. ☐ RAID LAN Storage/Backup
☐ 08. ☐ Network Test/Diagnostic Tools
☐ 09. ☐ Cables, Connectors, Baluns
☐ 10. ☐ UPS
☐ 11. ☐ Network Interface Cards
☐ 12. ☐ Peer-to-Peer LANs
☐ 13. ☐ SNMP Network Management
☐ 14. ☐ ATM Switches
☐ 15. ☐ Token-Ring Switches
☐ 16. ☐ Ethernet Switches
☐ 17. ☐ Remote LAN Access/Communications Servers
☐ 18. ☐ Superservers
☐ 19. ☐ File/Application Servers
☐ 20. ☐ Print Servers/Fax Servers
☐ 21. ☐ CD-ROM Servers
☐ 22. ☐ LAN Servers

INTERNETWORKING
A B
☐ 23. ☐ Bridges
☐ 24. ☐ Routers
☐ 25. ☐ Bridge/Router
☐ 26. ☐ Gateways
☐ 27. ☐ Intelligent Hubs
☐ 28. ☐ Stackable Hubs

COMPUTERS/PERIPHERALS
A B
☐ 29. ☐ Laptops/Notebooks/Sub-Notebooks
☐ 30. ☐ Micros/PCs
☐ 31. ☐ Minis
☐ 32. ☐ Mainframes
☐ 33. ☐ Workstations
☐ 34. ☐ Terminals
☐ 35. ☐ Printers/Network Printers
☐ 36. ☐ Cluster Controllers
☐ 37. ☐ CD-ROM
☐ 38. ☐ Fax/Modem Boards

REMOTE/WIRELESS COMPUTING
A B
☐ 39. ☐ PDAs
☐ 40. ☐ PCMCIA Devices
☐ 41. ☐ Wireless Data Services
☐ 42. ☐ Wireless Data Equipment
☐ 43. ☐ Wireless LANs
☐ 44. ☐ Cellular Equipment & Services

INTERNET/INTRANET
A B
☐ 45. ☐ Internet Access Service
☐ 46. ☐ Firewalls/Security
☐ 47. ☐ Web Servers

INTERNET/INTRANET (cont'd)
A B
☐ 48. ☐ Web Browsers
☐ 49. ☐ Intranet Applications/Groupware
☐ 50. ☐ Search Retrieval Products (web crawler)
☐ 51. ☐ Internet Development Tools
☐ 52. ☐ Internet Commerce Tools

SOFTWARE/APPLICATIONS
A B
☐ 53. ☐ Network Management
☐ 54. ☐ Systems Management
☐ 55. ☐ Security
☐ 56. ☐ Communications Software
☐ 57. ☐ Terminal Emulation
☐ 58. ☐ Word Processing
☐ 59. ☐ Operating Systems
☐ 60. ☐ Client/Server Applications Development
☐ 61. ☐ Database Management/RDBMS
☐ 62. ☐ Spreadsheet
☐ 63. ☐ Groupware
☐ 64. ☐ EDI
☐ 65. ☐ E-mail
☐ 66. ☐ Windows/Graphical User Interface
☐ 67. ☐ Multimedia
☐ 68. ☐ Graphics/DTP
☐ 69. ☐ Remote Access
☐ 70. ☐ Imaging
☐ 71. ☐ Server Suites (Back office, etc.)
☐ 72. ☐ Suites
☐ 73. ☐ Middleware
☐ 74. ☐ Document Management
☐ 75. ☐ Database Server
☐ 76. ☐ Site Metering Tools
☐ 77. ☐ Computer-Integrated Telephony (CIT)

WIDE-AREA NETWORK EQUIPMENT & SERVICES
A B
☐ 78. ☐ Frame Relay Equip./Services
☐ 79. ☐ Modems
☐ 80. ☐ FT-1/T-1/T-3 Multiplexers
☐ 81. ☐ FT-1/T-1/T-3 Services
☐ 82. ☐ SONET
☐ 83. ☐ Inverse Multiplexers
☐ 84. ☐ SMDS
☐ 85. ☐ Asynchronous Transfer Mode
☐ 86. ☐ Diagnostic/Test Equipment
☐ 87. ☐ DSU/CSU
☐ 88. ☐ VSAT/Satellite
☐ 89. ☐ ISDN Equipment & Services
☐ 90. ☐ PBXs
☐ 91. ☐ Voice Mail/Response
☐ 92. ☐ Videoconferencing
☐ 93. ☐ Leased Lines
☐ 94. ☐ Switched Data
☐ 95. ☐ E-mail
☐ 96. ☐ 800/900/MTS Services
☐ 97. ☐ Virtual Networks
☐ 98. ☐ Outsourcing/Systems Integration Services
☐ 99. ☐ Education/Training Services

☐ 107 ☐ None of the above (1-99)

7 Check ALL that apply in Columns A and B:

A. The following network platforms are currently installed:
B. The following network platforms are planned for purchase:

NETWORK PROTOCOLS
A B
☐ 01. ☐ SNA
☐ 02. ☐ DECnet
☐ 03. ☐ TCP/IP
☐ 04. ☐ Novell IPX/SPX
☐ 05. ☐ APPC/APPN/LU 6.2
☐ 06. ☐ NETBIOS
☐ 07. ☐ AppleTalk
☐ 08. ☐ NFS
☐ 09. ☐ IPv6
☐ 10. ☐ SNMP/SNMPv2
☐ 11. ☐ Other *(please specify)*____________

NETWORK OPERATING SYSTEM
A B
☐ 12. ☐ Microsoft (LAN Manager)
☐ 13. ☐ Novell (NetWare 2.X, 3.X)
☐ 14. ☐ Novell (NetWare 4.X)
☐ 15. ☐ Windows NT
☐ 16. ☐ Windows NT/Advanced Server
☐ 17. ☐ LocalTalk (AppleTalk)
☐ 18. ☐ Banyan (VINES)
☐ 19. ☐ IBM (LAN Server)
☐ 20. ☐ IBM (PC LAN Program)
☐ 21. ☐ Artisoft (LANtastic)
☐ 22. ☐ Digital (Pathworks)
☐ 23. ☐ Other *(please specify)*____________

LAN ENVIRONMENT
A B
☐ 24. ☐ 4M Token Ring
☐ 25. ☐ 16M Token Ring
☐ 26. ☐ Ethernet
☐ 27. ☐ Fast Ethernet
☐ 28. ☐ 100vg Any LAN
☐ 29. ☐ FDDI
☐ 30. ☐ LocalTalk
☐ 31. ☐ 10Base-T
☐ 32. ☐ ATM
☐ 33. ☐ Other *(please specify)*____________

COMPUTER OPERATING SYSTEM
A B
☐ 34. ☐ DOS
☐ 35. ☐ Unix/Xenix/AIX
☐ 36. ☐ OS/2
☐ 37. ☐ OS/2 Warp
☐ 38. ☐ IBM MVS
☐ 39. ☐ IBM VM
☐ 40. ☐ Digital VMS
☐ 41. ☐ Macintosh
☐ 42. ☐ Windows
☐ 43. ☐ Windows 95
☐ 44. ☐ NT
☐ 45. ☐ Solaris
☐ 46. ☐ Other *(please specify)*____________

☐ 47. ☐ None of the above (1-46)

8 What is your scope and involvement in purchasing decisions for network products & services for your enterprise?

A. SCOPE
(check one only)
1. ☐ Corporate/Enterprise
2. ☐ Department
3. ☐ None

B. INVOLVEMENT (check all that apply)
1. ☐ Recommend/Specify
2. ☐ Approve
3. ☐ Evaluate
4. ☐ Determine the need
5. ☐ None

9 What is the total number of LANs, workstations/nodes at this location/in your organization?

At this location:

	LANs		Workstations/ Nodes
1.	☐	5,000+	☐
2.	☐	1,000 - 4,999	☐
3.	☐	100 - 999	☐
4.	☐	50 - 99	☐
5.	☐	10 - 49	☐
6.	☐	1 - 9	☐

Entire organization:

	LANs		Workstations/ Nodes
1.	☐	5,000+	☐
2.	☐	1,000 - 4,999	☐
3.	☐	100 - 999	☐
4.	☐	50 - 99	☐
5.	☐	10 - 49	☐
6.	☐	1 - 9	☐

10 Please indicate your involvement in developing/implementing Internet/Intranet Technologies: (check all that apply)

1. ☐ Recommend/Specify
2. ☐ Approve
3. ☐ Evaluate
4. ☐ Determine the need
5. ☐ Implement
6. ☐ None

11 Which of the following hardware platforms are installed/planned in your company? (check all that apply)

	Mainframes A – Installed	Mainframes B – Planned
1. IBM	☐	☐
2. Amdahl	☐	☐
3. Cray	☐	☐
4. Hitachi	☐	☐
5. Unisys	☐	☐

	Minis C – Installed	Minis D – Planned
1. IBM	☐	☐
2. Digital	☐	☐
3. Tandem	☐	☐
4. Unisys	☐	☐
5. AT&T GIS	☐	☐
6. HP	☐	☐
7. Data General	☐	☐

What is the total number of Servers/Clients installed/planned: (USE NUMBERS ONLY)

E-AT THIS LOCATION	#	F-% with Internet Access
1. Servers		%
2. Clients		%

G-ENTIRE ORGANIZATION	#	H-% with Internet Access
1. Servers		%
2. Clients		%

Which of the following Servers/Clients do you have installed/planned: (CHECK ALL THAT APPLY)

	At this location:		Entire organization:	
	I-Servers	J-Clients	K-Servers	L-Clients
01. Power PC	☐	☐	☐	☐
02. Power Mac	☐	☐	☐	☐
03. Mac Other	☐	☐	☐	☐
04. Multi Processor Servers	☐	☐	☐	☐
05. P6	☐	☐	☐	☐
06. Pentium Pro	☐	☐	☐	☐
07. Pentium	☐	☐	☐	☐
08. 486	☐	☐	☐	☐
09. 386	☐	☐	☐	☐
10. 286	☐	☐	☐	☐
11. Risc	☐	☐	☐	☐
12. Other	☐	☐	☐	☐

12 Estimated gross annual revenue of your entire company/institution:

(check one only)

1. ☐ $10 billion or more
2. ☐ $1 billion to $9.9 billion
3. ☐ $500 million to $999.9 million
4. ☐ $100 million to $499.9 million
5. ☐ $50 million to $99.9 million
6. ☐ $10 million to $49.9 million
7. ☐ $5 million to $9.9 million
8. ☐ $4.9 million or less
9. ☐ None of the above

13 Estimated number of employees at this location/in entire organization:

At this location:
1. ☐ Over 10,000
2. ☐ 5,000 - 9,999
3. ☐ 2,500 - 4,999
4. ☐ 1,000 - 2,499
5. ☐ 500 - 999
6. ☐ 499 or less

Entire organization:
1. ☐ Over 10,000
2. ☐ 5,000 - 9,999
3. ☐ 2,500 - 4,999
4. ☐ 1,000 - 2,499
5. ☐ 500 - 999
6. ☐ 499 or less

14 For which areas outside of North America do you have purchase influence?

(check all that apply)

1. ☐ Europe
2. ☐ Asia
3. ☐ South America
4. ☐ Australia
5. ☐ Middle East
6. ☐ None

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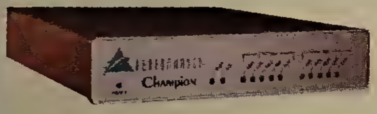
Briefs

Performance Telecom Corp. *has introduced an* **Asymmetric Digital Subscriber Line** *modem it says delivers 7M bit/sec toward the user and 640K bit/sec in the other direction over regular copper voice telephone lines. The Champion modems cost between $1,000 and $2,000 per line.*



Performance: (716) 654-5544.

Paradyne *recently announced the* **7610 DSU,** *which supports either 56K or 64K bit/sec digital data service speeds. It also features a V.35 interface and in-band management that supports SNMP. An optional graphical user interface for HP OpenView and NetView is available. The DSU will be available in December for $695.*

Paradyne: (813) 530-2000.

IBM *last week rolled out its CICS Gateway for Java Version 1.0 software, which will enable users to link CICS clients or servers and have* **mission-critical transaction processing applications** *communicate over the Internet. CICS clients can include IBM's OS/2 or AIX, Microsoft Windows NT or any network computing device; all must be running a Java-enabled browser. CICS Transaction Server and CICS Version 4.1 must be coresident on the mainframe.*

CICS Gateway for Java Version 1.0 is available this month. Pricing was not available.

IBM: (800) 426-2255.

Eicon Technology *last week announced SNA client software and a wide-area connectivity adapter for the IBM/Novell NetWare for SAA Version 2.2. Aviva is a 32-bit SNA emulation package that connects Microsoft Windows 95 and NT clients to the mainframe. The* **WAN interface card** *resides in a NetWare for SAA server. Aviva is available for $295. WAN interface cards sell for $795.*

Eicon (800) 803-4266.

White Pine takes dumb terminals for Web spin

By Michael Cooney
Nashua, N.H.

White Pine Software, Inc. is hoping to give dumb terminals enough smarts to browse the World-Wide Web while retaining access to key legacy applications.

The company recently announced its WebTerm Toolbox, a software package that will let users access applications on IBM mainframe or Application System/400 hosts, as well as Unix- and Digital Equipment Corp.-based servers, using a regular Web browser as the client.

The new product is part of a trend to provide legacy users with easy access to the growing Internet/intranet community without forcing them to throw out millions of dollars of existing equipment.

Browsers, Web servers and other Internet access products are drawing attention from the legacy community because, for the most part, browser software is easier to install, configure and maintain than traditional SNA or other host emulation software. Applications can theoretically be added and changed on a Web server with no impact on the clients — something that cannot be done in the traditional emulation world.

The main idea with these kinds of products is to open the world of legacy applications to the Internet or an intranet, said Frank Dzubeck, president of the Communications Network Architects, Inc. consultancy in Washington, D.C. "It also adds a degree of flexibility that those users never had in the past," he said.

WebTerm software resides on each client needing access to host resources. The package includes the company's 3270, 5250 or VT440 emulators, and utilizes Netscape Communications Corp.'s Power Plug-in technology to provide the communication between the client and the host.

COMPETITIVE COMPARISION

Company	Product	Terminal support	JavaScript support	Additional server requirements
White Pine	WebTerm Toolbox	VT420 tn3270 tn5250	●	—
OpenConnect	WebConnect Gold	tn3270 VT220	—	●
Information Builders	Web3270	tn3270	—	●
Simware	Salvo Connect	none	—	●

● Yes — No

The product works with any existing Netscape or Microsoft Corp. Explorer browser package to link to a local Web server. WebTerm then instructs the server to attach to a mainframe, midrange or other legacy server. Once the connection is made, users can view the legacy applications and other Internet or intranet applications on the Web server simultaneously.

WebTerm also supports JavaScript so users can create buttons, menus or other customized features that will make using the package easier than a traditional emulator. It runs on Microsoft Windows and Apple Computer,

See White Pine, *page 23*

NetSys Webifies router modeling

By Jim Duffy
San Jose, Calif.

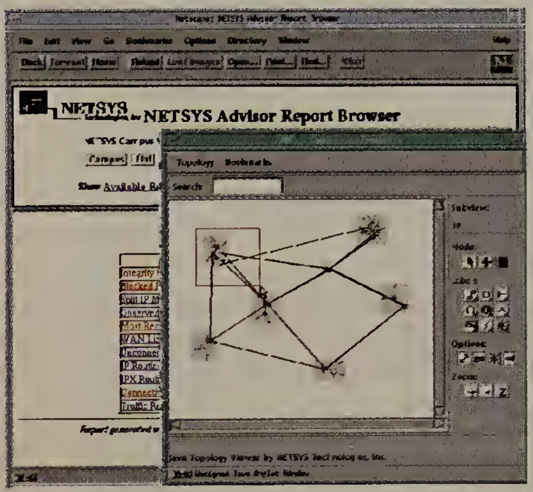
NetSys Technologies, Inc. last week unveiled additions to its line of network modeling software that use Java and the World-Wide Web to speed troubleshooting.

The new NetSys Advisor software is designed to help IS staff meet service-level agreements by tracking end-to-end network performance. It is also intended to help automate router configuration changes, which could expedite problem resolution.

"It's a major improvement over the prior releases of the software," said Dave Cronberger, network architect at Ameritech Corp. "I've written a change control process around the tool because of the reports I can get out of it and the planning I can do without going into the real network and executing changes on an experimental basis."

NetSys Advisor isolates common routing and security problems, and then suggests command-specific changes to the network to fix these problems. Proposed

See NetSys, *page 23*


NETSYS Advisor Report Browser
Topology
Search
Java Topology Viewer by NETSYS Technologies, Inc.

NetSys Advisor *now presents troubleshooting information in Web formats with Java.*

IBM gets serious about NCs

By Michael Cooney
Somers, N.Y.

If the network computer revolution takes place, IBM will be there.

The company last week formed a Network Computer Division that will coordinate all of IBM's efforts in the development of Internet appliance system hardware, software and network management. It will also market the devices.

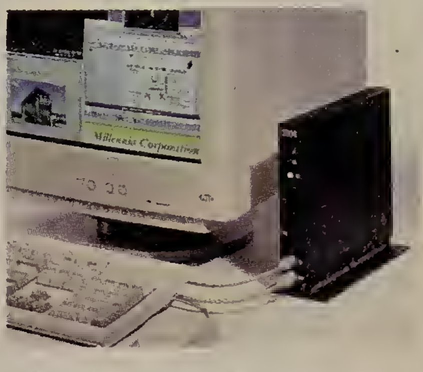
"For all intents and purposes this is IBM's 'client division,' " said Sam Albert, president of Sam Albert Associates, a consultancy based in Scarsdale, N.Y.

IBM recently announced its Network Station, the first in a family of small, network-ready devices that promise to lower net access and hardware costs while providing quick, easy links to Internet/intranet resources.

IBM's Network Station is a 66-MHz PowerPC-based unit capable of linking to a single Ethernet or token-ring LAN. The device runs Netscape Communications Corp.'s Navigator 3.0, which will be customized by that company's Navio subsidiary for the Network Station. IBM is looking to deliver the de-vice by year-end for about $700.

IBM executives said they are targeting the Network Station at a wide swath of business users — from those looking to replace 3270/5250 terminals to PC users looking for simple 'Net connectivity. The new division will work to ensure that the Network Station will conform to the network computer reference profile, a set of architecture features, functions and protocols IBM, Sun Microsystems, Inc., Netscape and others agreed upon as standard characteristics of 'Net appliances (*NW*, May 20, page 1).

The Network Computer Division will be lead by Bob Dies, formerly general manager of the Application System/400 midrange division, which had been tasked with the Network Station development until now. ■



IBM's *Network Station now has a home: the Network Computer Division.*

ESSC service promises five-minute warning

By Jim Duffy
Carrollton, Texas

Genicom Corp.'s Enterprise Service Solutions Company `(ESSC) last week unveiled a remote network management service that can alert users to potential problems within five minutes.

ESSC's Protocall service can also save users hundreds of thousands of dollars per year over alternative fault-monitoring scenarios, the company claimed.

Protocall is a 24-hour, out-of-band remote network fault-monitoring service that detects and isolates problems, and can recommend solutions.

The service is designed to increase network availability and internal staff productivity.

According to a recent Gartner Group, Inc. study, IS personnel spend most of their time on tactical network "fire fighting" rather than strategic planning or deployment. Protocall can reduce the time spent fire fighting by 80%, ESSC claimed.

Annual costs of network fault resolution

	Non-monitored	Dedicated
	$374,191	$478,605
Outtasked	–$146,525	– $146,525
Savings from outtasking	$227,666	$332,080

SOURCE: GENICOM'S ESSC, CHANTILLY, VA.

Key to the Protocall service are network probes placed on individual LAN segments.

Protocall supports SNMP, Remote Monitoring (RMON) and pre-RMON2 data collection standards.

When these probes collect data that signifies a fault, proprietary ESSC software analyzes the fault data and merges it with data from the Protocall knowledge base to populate a trouble ticket. The knowledge base also generates a resolution process for fixing the fault.

A network technician at the ESSC network control center will then call the customer within five minutes with the problem isolated, fault identified and a remedy recommended. This is intended to enable IS personnel to resolve faults before they impact end users.

Protocall uses out-of-band analog telephone lines for alarm notifications and to notify ESSC personnel of problems.

This frees up network bandwidth for payload traffic and helps ensure that network health information reaches ESSC personnel even if primary network links fail, ESSC said.

A service such as Protocall can save users $332,080 per year compared to a dedicated fault-monitoring solution deploying internal IS staff, according to ESSC.

It can save users $227,666 per year more than a nonmonitored fault resolution system, the company claimed.

Protocall is priced starting at about $1,075 per month for 7x24 monitoring. It is available now.

©Genicom ESSC: (800) 380-5888.

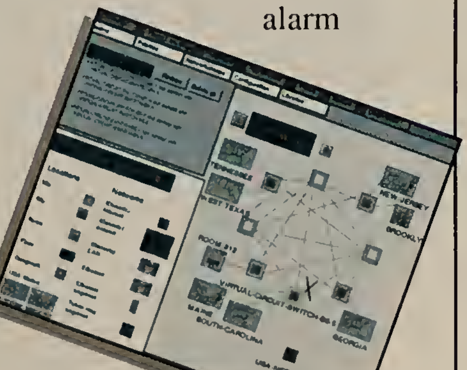
"What-if ..."

you could

- detect & diagnose network problems quickly,
- intelligently filter & correlate alarms,
- guide operators to quick problem resolution?

You can.

Gensym's G2® software allows you to quickly develop intelligent fault management systems for large complex networks. Working in real time, G2 filters and correlates alarm



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Circle Reader Service #26

Network management

BMC beefs up Patrol management

By Jim Duffy
Houston

BMC Software, Inc. last week rolled out a new version of its Patrol application management software, designed to enhance the view of the managed environment and diagnose problems faster.

ON PATROL

BMC's latest moves in application management:

- Patrol 3.1
  Logical application views
  Speedier problem diagnosis
- Reseller agreement with Digital

Patrol Version 3.1 provides both physical and logical application views of a managed environment. Most other products use physical views that group together objects and represent them as sets of machines, BMC said.

With this latest version, IT managers can represent their environment logically by grouping objects together in multiple containers to build customized views.

For example, an application may rely on multiple operating systems and databases, or several applications can share the same operating systems and databases. Patrol gives an IT manager the ability to drag and drop the objects related to each application into multiple logical containers. All associated detail can be accessed directly from the logical containers, allowing the IT manager to start with a holistic application view and quickly move to the physical component experiencing a problem.

Patrol Version 3.1 also includes many enhancements and features around the graphical user interface, which are designed to improve the speed of problem diagnosis. One such enhancement is Agent Query Tool, which enables IT managers to create custom queries and build specific views of their environment, based on the needs of the IT managers or the organizations.

BMC also announced that onetime network and systems management behemoth Digital Equipment Corp. will resell all Patrol knowledge modules and consoles.

Patrol Version 3.1 is available now. Pricing begins at $6,000.

©BMC: (713) 918-8800.

IBM pumps up mainframe server suite

By Michael Cooney
Poughkeepsie, N.Y.

IBM last week continued its effort to reduce the costs of running mainframes as enterprise servers by introducing Communications Server for MVS.

Communications Server for MVS is a multifaceted communications gateway for the mainframe. It combines four previously separate products into one, and lets customers more economically support large SNA and TCP/IP networks.

Communications Server for MVS is the largest member of IBM's seven-member Software Server family, which includes a series of modular application packages that can run on a variety of operating systems and hardware. At the low end, the Software Servers are intended to simplify what has been a hodgepodge of products, and give IBM a weapon to battle Microsoft's BackOffice server suite. But the MVS server is designed to go beyond that to give users a stepping stone to migrate to OS/390, and eliminate the cost of buying and integrating complex mainframe software packages.

"For users who don't have plans to go to OS/390 in the next couple of years, this package is ideal," IBM's Duncan said.

"For users who don't have plans to go to OS/390 in the next couple of years, this package is ideal," said William Duncan, manager of IBM's enterprise communications software.

OS/390 is IBM's follow-on to the MVS mainframe operating system. It includes Communications Server for MVS functionality.

The central components of Communications Server for MVS include VTAM Version 4.3, TCP/IP for MVS Version 3.2, OpenEdition for MVS and AnyNet/MVS. VTAM controls the flow of communications to the mainframe, while TCP/IP for MVS links IP nets to the mainframe.

OpenEdition is IBM's Unix-compliant software, which turns the mainframe into a big Unix server. Finally, the AnyNet feature supports TCP/IP Socket traffic over SNA or lets SNA applications on the mainframe communicate with remote applications over TCP/IP backbones.

None of the communications capabilities is new to the mainframe but having them integrated in one package is, Duncan added.

Communications Server for MVS is available now. Pricing varies based on processor size. A midsize Communications Server for MVS license can run about $6,000 a month, Duncan said.

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*Circle Reader Service #***24**

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Circle Reader Service #35

Tut takes a different view of xDSL

By Tim Greene
Pleasant Hill, Calif.

The same Digital Subscriber Line (DSL) technology being developed for broadband Internet or remote access is now being pushed as a way to link sites on a campus.

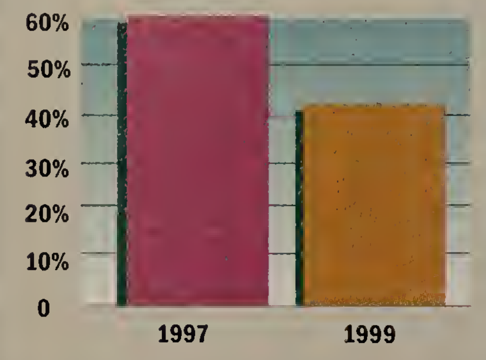
By the end of the month, Tut Systems, Inc. will introduce the XL18000, a DSL modem designed to link LANs that are as much as 18,000 feet apart with a 384K bit/sec connection over a regular copper phone line. For sites closer together, the XL18000 can offer 768K bit/sec in both directions at 12,000 feet or less, the company said.

Mickey Ryan, telecom specialist for the Lockheed-Martin Corp. Skunkworks division in Palmdale, Calif., said he started using the XL18000 beta version full-time to connect a newly formed workgroup in buildings about a mile apart. The company had extra copper pairs between the buildings. The alternative was installing a T-1, which was overkill for the bandwidth needed and had a monthly cost of $300 after a $1,000 installation fee, Ryan said.

HDSL LEADS IN THE SHORT TERM

Of all the Digital Subscriber Line technologies, High-bite-rate DSL will dominate the market through 1999.

(Percentage of DSL market)



SOURCE: TELECHOICE, VERONA, N.J.

Tut has incorporated rate adaptive features that allow the user to configure the devices to provision more or less bandwidth, depending on the quality and length of the line.

IPExpress modems

With the same technology, Tut is making the leap from the campus to the carrier market, by providing a customer-end modem known as IPExpress and a central office platform called IPExpress AT.

Tut IPExpress is a single modem, while the AT is a modem rack that can take in 19 customer lines and feed an Ethernet switch — a configuration a carrier might use to provision Internet access.

Tut's products challenge the popular notion that users want traffic coming at them from the Internet at blinding speed but can get by with much lower speeds when sending onto the Internet. That is the model for Asymmetric DSL (ADSL), which can transport data to the user at 7M bit/sec and take it away at 640K bit/sec.

That model may be flawed, according to Sal D'Auria, Tut's president and chief executive officer. As users rely on high-bandwidth Internet access, they will employ the Internet to send and receive larger and larger files. To do that, they will want a symmetrical access line, he said.

Not everyone agrees. Kieran Taylor, broadband consultant for TeleChoice, Inc. in Verona, N.J., said the Tut products were likely to be overtaken by ADSL in the long run. "Success for [Tut's two-wire High-bit-rate DSL technology] in the public network is dubious," Taylor said.

The Tut XL18000 and IPExpress are expected to be available in the first quarter of 1997. Prices will range from $1,500 to $2,100 per line.

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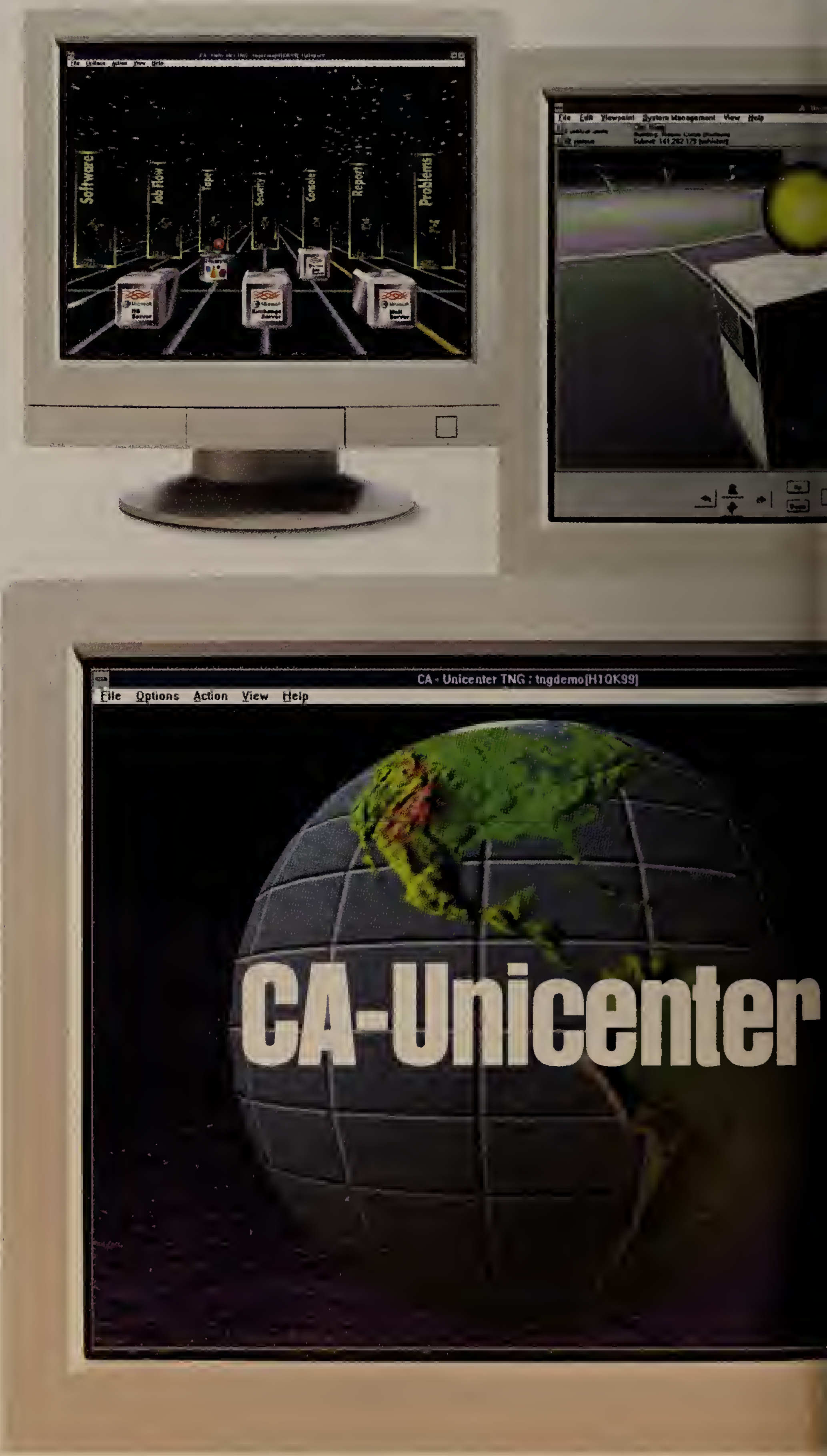
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NetSys

Continued from page 17

changes can be tested offline in the NetSys replicated network model before being deployed on the production network. This "model-based reasoning" enables NetSys Advisor to understand the underlying configurations and interrelationship of devices on the network, which helps it diagnose network problems, NetSys said. Users can see which router configurations have changed, how they have changed, and how those changes impact connectivity and performance across the entire network, NetSys said.

All of these tasks — as well as connectivity and performance reports, integrity checks and protocol-sensitive topologies — can be accessed through a Java-enabled browser. This allows any network operations staffer to access information on network health from anywhere in the network, the company said.

Ameritech's Cronberger says there is still room for improvement, however.

"The CPU utilization of the host I run the product on tends to run a little on the slow side," he said. In addition to performance, Cronberger would like to see parsing of IBM SNA configuration data.

NetSys also enhanced its Connectivity Tools and Performance Tools software offerings. Connectivity Tools 3.0 now includes a topology manager and expanded reporting capabilities.

Performance Tools 2.0 can now collect data from a wider range of Cisco Systems, Inc. devices. NetSys Advisor starts at $1,500 and is available now.

©NetSys: (800) 463-8797.

White Pine

Continued from page 17

Inc. Macintosh clients today.

"The Web site can be updated and changed without having to redo everything at the client, which will save thousands of dollars in administration costs," said Steve Parsons, senior product manager with White Pine. An administration package is also available to help users track and set up additional sessions in the WebTerm environment, he said.

WebTerm will be available this month for $69 per desktop. The WebTerm Administrator package is available for an additional $169.

©White Pine: (603) 886-9050.

Read up on efforts by IBM and others to bring Web pages to 3270 terminals.

Enter the number to the right in the DocFinder box on the home page.

FIND IT ON FUSION 5 0 5 3

NetworkWorld Fusion http://www.nwfusion.com

BusinessBriefs

Bay Networks, Inc. last week announced the appointment of **Dave Shrigley,** formerly Intel Corp.'s vice president of corporate marketing, to the position of executive vice president for sales, service and marketing. Shrigley is the second Intel executive tapped by Bay to turn the company around. **David House,** former senior vice president and general manager of Intel's Enterprise Server Group, was named president, chairman and chief executive of Bay two weeks ago. Shrigley will be in charge of crafting and integrating corporate image and communications, as well as overseeing Bay's worldwide sales and service teams. He will work with Bay's Enterprise, Internet/Telecom and Commercial business units in developing and executing industry product plans.

Cabletron Systems, Inc. said its Spectrum Test Drive program had a 50% hit rate. Spectrum Test Drive was initiated by Cabletron last year to convert users of competing management platforms to Spectrum. About 200 companies switched.

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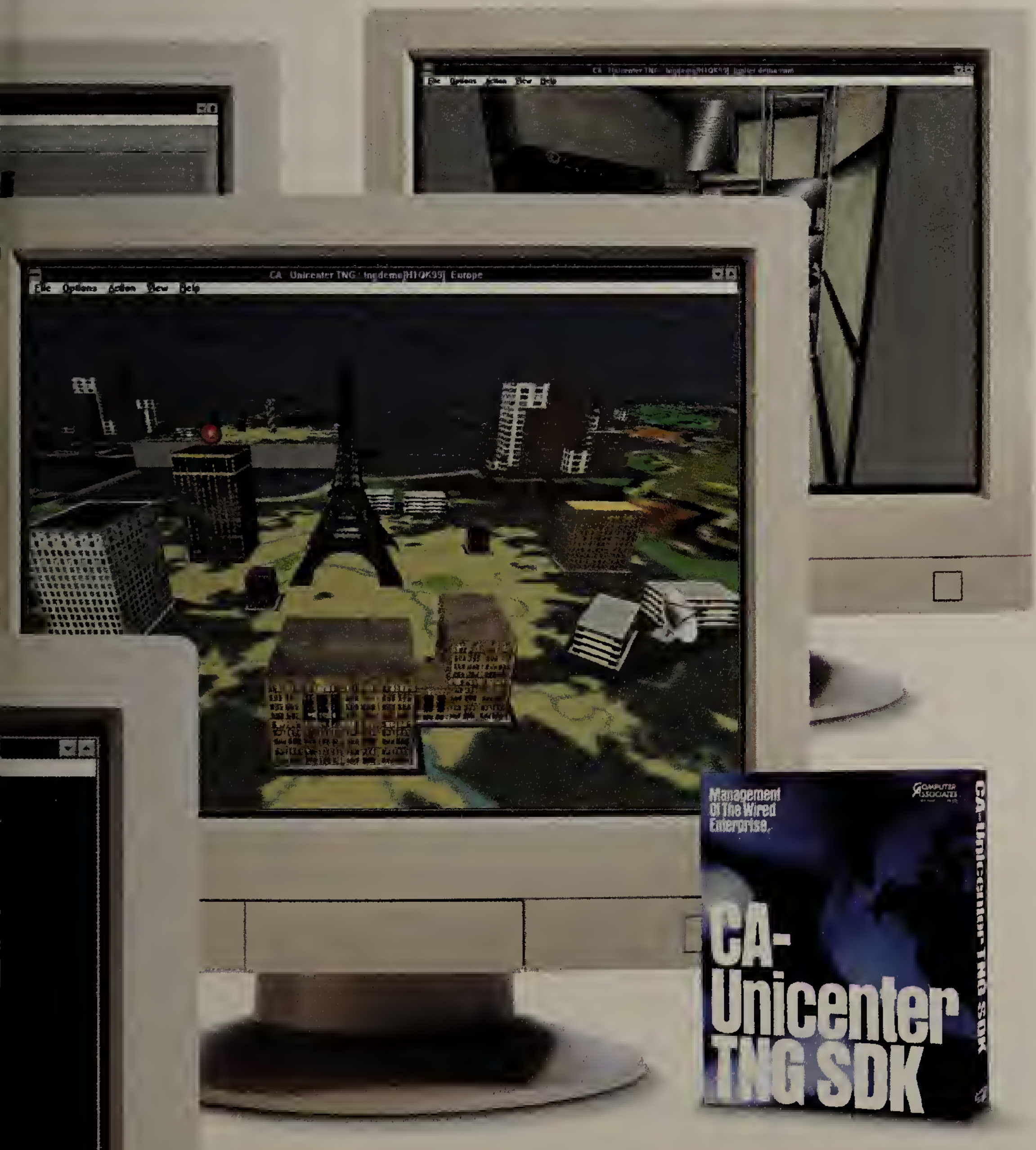

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Chicago, IL	Sep. 11
Cincinnati, OH	Aug. 15
Cleveland, OH	Dec. 10
Columbia, SC	Oct. 18
Columbus, OH	Aug. 12
Dallas/Ft. Worth, TX	Oct. 18
Denver, CO	Sep. 12
Des Moines, IA	Sep. 27
Detroit, MI	Dec. 5
Edmonton, Alb., Can.	Dec. 5
Houston, TX	Oct. 21
Indianapolis, IN	Sep. 9
Irvine, CA	Nov. 6
Jackson, MS	Oct. 15
Jacksonville, FL	Sep. 30
Jersey City, NJ	Nov. 13
Kansas City, MO	Oct. 1
Knoxville, TN	Oct. 11
Lexington, KY	Oct. 9
Little Rock, AR	Sep. 23
Los Angeles, CA	Nov. 8
Louisville, KY	Oct. 7
Memphis, TN	Sep. 25
Miami, FL	Oct. 4
Milwaukee, WI	Sep. 13
Minneapolis/St. Paul, MN	Sep. 16
Montgomery, AL	Oct. 9
Nashville, TN	Sep. 27
Norfolk, VA	Oct. 29
Oklahoma City, OK	Sep. 18
Omaha, NE	Sep. 25
Parsippany, NJ	Nov. 15
Philadelphia, PA	Nov. 11
Phoenix, AZ	Nov. 1
Pittsburgh, PA	Dec. 12
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San Diego, CA	Nov. 4
San Francisco, CA	Nov. 15
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St. Louis, MO	Oct. 3
Tampa, FL	Oct. 2
Tucson, AZ	Oct. 30
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Circle Reader Service #44

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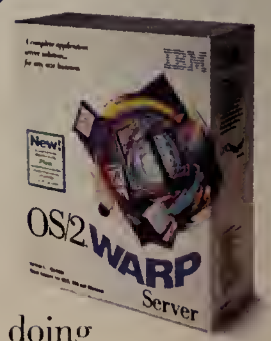
NETBEYOND, THE EXTENDED NETWORK SYSTEM FOR SMALL AND MEDIUM-SIZED BUSINESSES.

"The built-in systems management utilities that came with OS/2 Warp Server

really pumped up my network."



Power

When Nina Giske, a network administrator for the Confederation of Norwegian Business and Industry, was introduced to OS/2® Warp Server at a symposium in Paris, she didn't realize the effect it would have on her when she got back home and installed the trial copy.

Why so? Because, even though she'd been using earlier versions of LAN Server on her networks in Oslo, OS/2 Warp Server's performance really blew her away. And with its easy installation and built-in utilities, Nina was quite impressed. She particularly liked the systems management features that would give her control of desktops for remote changes and updates. On top of that, the new drag-and-drop administrator's interface made doing everything easy. And with a ton of other features, like easy Internet and intranet connectivity and an ability to handle big databases, Nina knew a good thing when she saw it.

Find out what made Nina's trip to Paris so memorable. Call 1 800 IBM-2468, ext. EA130, or visit www.software.ibm.com/info/ea130 for the software that thinks it's on steroids.

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Carrier Services

Covering: Local and Long-Distance Services • Value-Added Networks • Cable, Satellite and Wireless Networks • Regulatory Affairs • Carrier-Based Internet Services

Briefs

■ *A new study reveals that 73% of wireless telephone users think they already have* **digital wireless service.** *The actual number is just under 5%, according to study author Thomas Ross, a consultant for Washington, D.C. market research firm* **Malarkey-Taylor Associates, Inc.** *"This misconception will be quite a hurdle for carriers planning to offer digital wireless service," Ross said.*

■ *Local exchange powerhouse* **GTE Corp.,** *which has been on a roll getting its way in regulatory matters,* **finally lost a battle** *earlier this month. Virginia regulators rejected GTE's request to be classified as a rural carrier, citing parts of its operating territory near Richmond and Washington, D.C. Such a designation as a rural carrier would have exempted GTE from some of the requirements to interconnect with competitors under the Federal Communications Commission's new rules. GTE was actually one of the carriers that successfully petitioned for a court stay of the FCC rules until at least January.*

■ **Telecom Ireland, Ltd.** *is completing a new direct marketing facility in the Shannon Free Zone outside Dublin for* **outsourcing European telemarketing.** *Users can hire telemarketers through Telecom Ireland to make calls throughout Europe for direct sales. The carrier handles planning, managing and billing, and provides multilingual call agents.*

Telecom Ireland: (800) 445-4475.

■ **MFS Communications Company, Inc.** *last week received permission from Germany to build and operate a* **fiber network among German cities** *and internationally from those sites. The license restricts MFS to carrying data, Internet traffic, private lines and closed-network voice traffic.*

Schools could get cut-rate network services

Federal-state panel votes to recommend new plan envisioned by Congress; FCC approval seems likely.

By David Rohde
Washington, D.C.

A joint panel of federal and state regulators has voted to recommend a wide-ranging program under which carriers would be forced to sell network services to schools and libraries at big discounts.

The move promises to dramatically lower the cost of installing WAN applications at educational institutions. But critics said it could raise the overall cost of net services for other end users.

The Federal-State Joint Board, a committee established by the Telecommunications Act of 1996, earlier this month said carriers should discount their services between 20% and 90% when providing them to schools. The unanimous recommendation now goes to the Federal Communications Commission, which must decide by next May whether to put the discounts into law. Since three of the four sitting FCC commissioners are members of the joint board, approval is considered likely.

Carriers tap funds

To pay for the discounts, carriers would be entitled to tap the Universal Service Fund, a multibillion-dollar pool of money funded by carrier payments. Traditionally, the fund has been used to subsidize rural telephone customers who live far from a telco central office, but the 1996 act expanded the fund's purpose.

The joint board said the additional universal service payments, which carriers need to make to support the discounts, should not be passed on to businesses and consumers. But critics said that is bound to happen.

The educational subsidies will cost "billions, if not tens of billions, every year," said Wayne Leighton of Citizens for a Sound Economy, a lobbying group. "While technology such as Internet access is a good thing, it may not be needed in every classroom — shop class comes to mind — and cannot replace books."

Initial reactions from carriers were cautious, since carrier officials were also concerned with recommendations to change the overall structure of the universal service system.

The exact discounts would be based not on type of service, but on the location of the schools. Academic institutions from poorer communities would get greater discounts, with the average deductions running about 60%.

Gore *hails "bold move" to give discounts to schools and libraries.*

Top Clinton administration officials pushed heavily for such a scheme.

"Wealthier schools are twice as likely as poor schools to have Internet access, and wealthier students use computers 20% more than their poorer peers," Vice President Al Gore said in a statement hailing the vote. "The joint board's recommendations represent a bold move toward eradicating this gap."

To the relief of Internet service providers, the board did not recommend that contributions to the Universal Service Fund be made on revenues from Internet and online services.

But observers said the FCC may still consider forcing ISPs to pay access fees to local exchange carriers, just as long-distance carriers are required to pay to LECs that carry the local portion of their long-distance calls.

FCC officials said universal service and access charge reform — although technically separate issues — are closely related, and final rules may be issued at the same time next May. ■

NYNEX performance still an issue in merger

By Tim Greene
Albany, N.Y.

While approval of the Bell Atlantic Corp.-NYNEX Corp. merger sailed smoothly past the shareholders of both companies this month, getting New York state regulators to sign on continues to prove vexing.

The New York State Public Service Commission (PSC) recently said it would let third parties testify about the proposal, an expansion of its initial ground rules to have only its staff develop a recommendation.

That does not affect the commission's timetable to rule early next year about approval. However, it does inject comment from consumer groups that have been critical of NYNEX in New York.

The PSC chairman said service levels in New York will be a factor in whether the commission signs off on the merger.

The consumer groups are armed with newly released PSC reports that show NYNEX failed to meet its own performance goals, including timeliness of response for trouble reports and lines out of service for more than 24 hours.

While NYNEX missed its goals, it missed them by less in the past fiscal quarter than it has previously. A five-year agreement made last year with the PSC sets progressively tougher standards.

Matt O'Brien, senior analyst at Prodigy Services Co. and president of the Communications Managers Association, said users he has spoken with are concerned about how the merger will affect the service they are getting and who will be delivering it.

"Everybody wants to know what's going to happen to their account teams. I've got three account teams covering Maine to Virginia. Two of them are really bad, one is great. I want to have a say [in which ones I get to keep]," O'Brien said.

In addition to NYNEX's hurdles, Bell Atlantic has had a rocky relationship with the Communications Workers of America (CWA) over layoffs in the face of the merger. The CWA was fighting to protect jobs that would fall under newly formed unregulated entities the carrier might form to deliver services other than voice and data telephony.

Earlier animosity seems to be cooling, though, with issuance of a pact two weeks ago that said the union would work with Bell Atlantic, as the new company will be called, to provide "exceptional service."

Meanwhile, Bell Atlantic and NYNEX are still awaiting a U.S. Department of Justice ruling on whether to block the merger based on antitrust laws. The Justice Department recently found that the merger of Pacific Telesis Group and SBC Communications, Inc. did not violate those laws.

NYNEX REPORT CARD

In the past year, the New York State Public Service Commission has penalized NYNEX $62.3 million for:

- ☑ Failing to cut service complaints filed with the commission.
- ☑ Allowing trouble report rates to rise above limits.
- ☑ Missing repair appointments.
- ☑ Letting too many lines go unrepaired for more than 24 hours.

SOURCE: NEW YORK STATE PUBLIC SERVICE COMMISSION, ALBANY

That merger is still on hold until the Federal Communications Commission and regulators in California and Nevada give their approval.

The Pacific Telesis-SBC merger was announced about three weeks before the Bell Atlantic-NYNEX merger, so the Justice Department's review of the Bell Atlantic-NYNEX merger lags behind.

Senior Editor David Rohde contributed to this story.

MCI posts frame relay circuit reports on Web

By David Rohde
Washington, D.C.

MCI Communications Corp. has become the second long-distance carrier to offer frame relay users a Web interface into carrier performance reports.

But instead of cranking out its own — as LDDS WorldCom did with its Web Network Management Service (*NW*, Sept. 30, page 8) — MCI turned to an outside vendor. The carrier earlier this month signed a deal with Concord Communications, Inc. of Marlborough, Mass., to provide Concord's Network Health-Frame Relay reports over secure Web sites to MCI's managed WAN customers.

The reports will help users gauge whether MCI is living up to its service-level guarantees for delivery of frames on the first try. MCI's frame delivery guarantees range from 99% for permanent virtual circuits (PVC) with a committed information rate (CIR) of zero — meaning that every frame is marked discard-eligible in case of network congestion — to 99.9% for high CIRs.

"With our reports, carriers can say [to users], 'This is a way to keep both of us honest,' " said Concord spokeswoman Christine Washburn.

Besides seeing reports indicating how many, if any, frames are being discarded, users can also determine whether utilization of their PVCs is running well above or below the contracted CIR level.

Like other carriers, MCI already provides a form of performance measurement reporting to some users of its HyperStream frame relay service. But those reports — generated by the carrier's internal HyperScope network management system — are more analogous to line-by-line call-detail reporting than the graphical summaries generated by Concord's Network Health.

TAKING MEASUREMENTS

Concord's Network Health reports will measure the following aspects of MCI's HyperStream frame relay service:

- Bandwidth utilization
- Percentage of frame discards
- Router CPU utilization
- Overall network volume
- Situations to watch

The MCI/Concord deal is expected to be worth about $3 million to Concord. MCI will not actually charge users extra for the reports. But the carrier will only include the reports in its Enterprise WAN Managed Services offer, which includes configuration, installation, and ongoing monitoring of routers and other customer premises equipment.

MCI is the second carrier to incorporate the Network Health reports into its managed WAN service. The first was Ameritech Corp., although the regional Bell operating company did not standardize access to the reports through a Web browser interface (*NW*, Aug. 26, page 21).

Concord also sells the Network Health product line — which includes integrated LAN/WAN and router/switch measurement tools as well as frame relay performance reports — directly to end users.

More carriers are likely to turn to Concord over the next few months to satisfy user demands for performance reporting, said Liza Henderson, a broadband consultant for TeleChoice, Inc. in Verona, N.J.

Internet service providers are also looking at the product, but not for service-level guarantees. "Initially, they will use it for internal provisioning and management," Henderson said. ■

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Circle Reader Service #48

You called it.

In the annual Data Communications magazine User Survey of Long-Distance Carriers, AT&T was rated #1 in five categories: customer service, network performance, Internet access, [illegible] service and switched digital service. In fact, this is the third year [illegible] on top in every quality performance measure. So for [illegible] services you can always count on, there's only one call [illegible] www.att.com/business.

AT&T

WAN MONITOR

I scream, you scream...for DSL

It's nearly 1997. Do you know what your carriers are planning for Digital Subscriber Line (DSL) deployment? If not, find out. This is a technology that could save you money and enable new connectivity options for remote offices into the backbone corporate network and the Internet.

DSL has been likened to ISDN because it promises to deliver high-speed transmission over standard copper wires. But the faster DSL won't go through the decade-long delivery cycle that plagued ISDN. At least, we hope it won't.

Unlike ISDN, DSL is not a protocol — it is a physical layer transport. So while ISDN users have been plagued with the complexity of the protocol, Asymmetric DSL (a promising DSL flavor) users will be employing protocols that are well-defined, such as IP, frame relay or ATM.

And while ISDN has enjoyed moderate success, its 128K bit/sec of bandwidth represents just four times what users get with analog modems today. Compare that to ADSL designs that can deliver speeds of 6M bit/sec (more or less).

But DSL's real trump card may be that it uses frequency division to carry voice and data over a single physical connection. This eliminates the need for users to run a second line into their home or business — a key advantage when the dwindling copper-loop plant is taken into consideration.

Finally, DSL has the advantage of having a large number of major equipment vendors behind it at an early stage in the game. TeleChoice found this out when it recently published "The TeleChoice xDSL Sourcebook" — a detailed listing of vendors with DSL plans in place. We found that over 80 companies have or will soon have DSL equipment available.

Daniel Briere and Christine Heckart

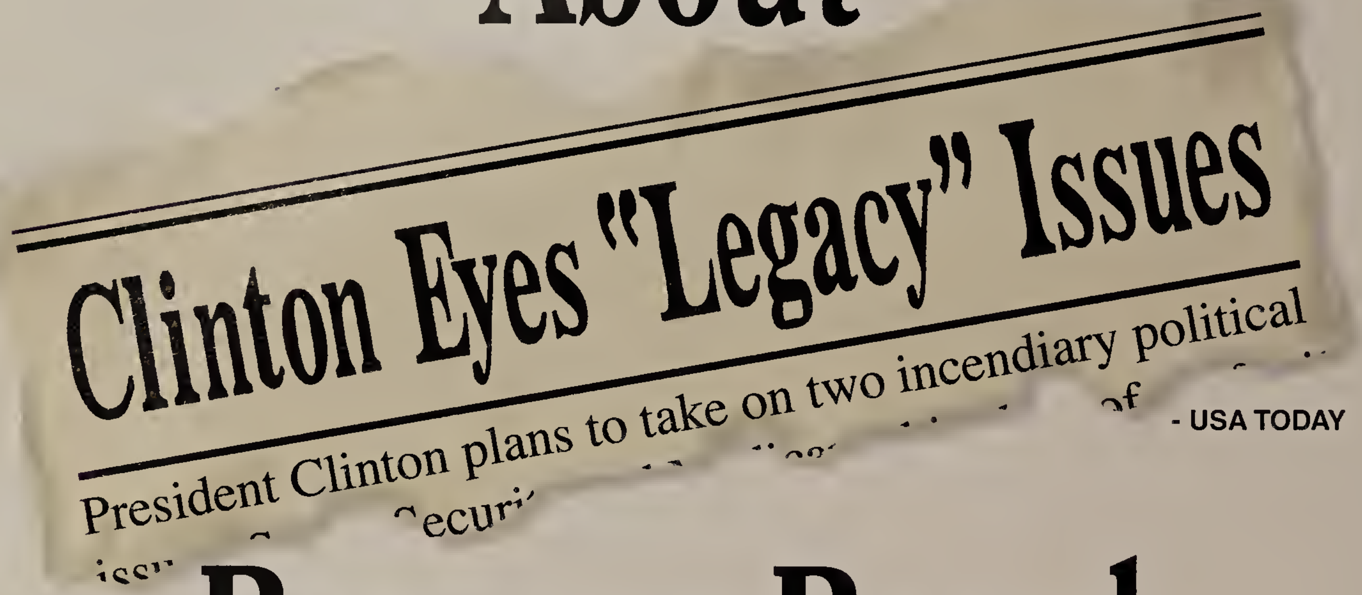
DSL's biggest obstacles aren't technical; they're primarily organizational and political. While most telephone companies are actively trialing DSL in limited locations, the typical time to market for new services is 18 months or more.

Users interested in taking advantage of DSL's benefits in the near term may be helped along by local telecom deregulation. The smaller providers, such as competitive access providers, may be best positioned to deliver DSL by taking advantage of the unbundling rule.

And while DSL's future is usually linked to the residential broadband market, its short-term success will likely be in the business markets as an access solution for remote LAN interconnect, 'Net, intranet and other data application needs.

We encourage you to petition your service provider for DSL-based services. If you don't know who to call, send an E-mail to adsl@telechoice.com. We will compile the requests and forward them to the ADSL Forum, which is tracking demand. Service providers familiar with the lukewarm acceptance that ISDN received are reluctant to embrace another local-loop technology. But ADSL is not an ISDN, and it's up to users to let their providers know these benefits are needed now.

Briere is president and Heckart is director of broadband with TeleChoice, Inc., a consultancy in Verona, N.J. They can be reached at dbriere@telechoice.com and checkart@telechoice.com.



He Must Be Talking About

Clinton Eyes "Legacy" Issues

President Clinton plans to take on two incendiary political

- USA TODAY

Browser-Based Mainframe Access

Hail to the Chief! If the President of the United States is looking into it – it must be important. Browser-based access to "legacy" systems makes existing applications and data more widely available to internal customers over intranets, and extends this infrastructure to customers, distribution channels, and business partners over the Internet.

The advantages of integrating host information using OpenConnect's new SNA Web co-processing technology, OC://WebConnect™, and its companion integrated development environment, OpenVista™, have become very compelling. OpenConnect Systems' browser-based host access increases the value and the availability of SNA mainframe and midrange applications and data without sacrificing SNA network performance, management or security.

Using OpenVista, you can rejuvenate host applications with graphical user interfaces and offer them to a whole new class of users with less training, and little or no distribution costs. You'll reduce network bandwidth utilization, without modifying the existing host application.

To learn how you can make the move to browser-based access for your mainframe, call for your free white paper which outlines the business benefits of browser-based host access and rejuvenating your mainframe applications. Doing so will make you appear very presidential.

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Circle Reader Service #31

This is your client's Intranet budget.

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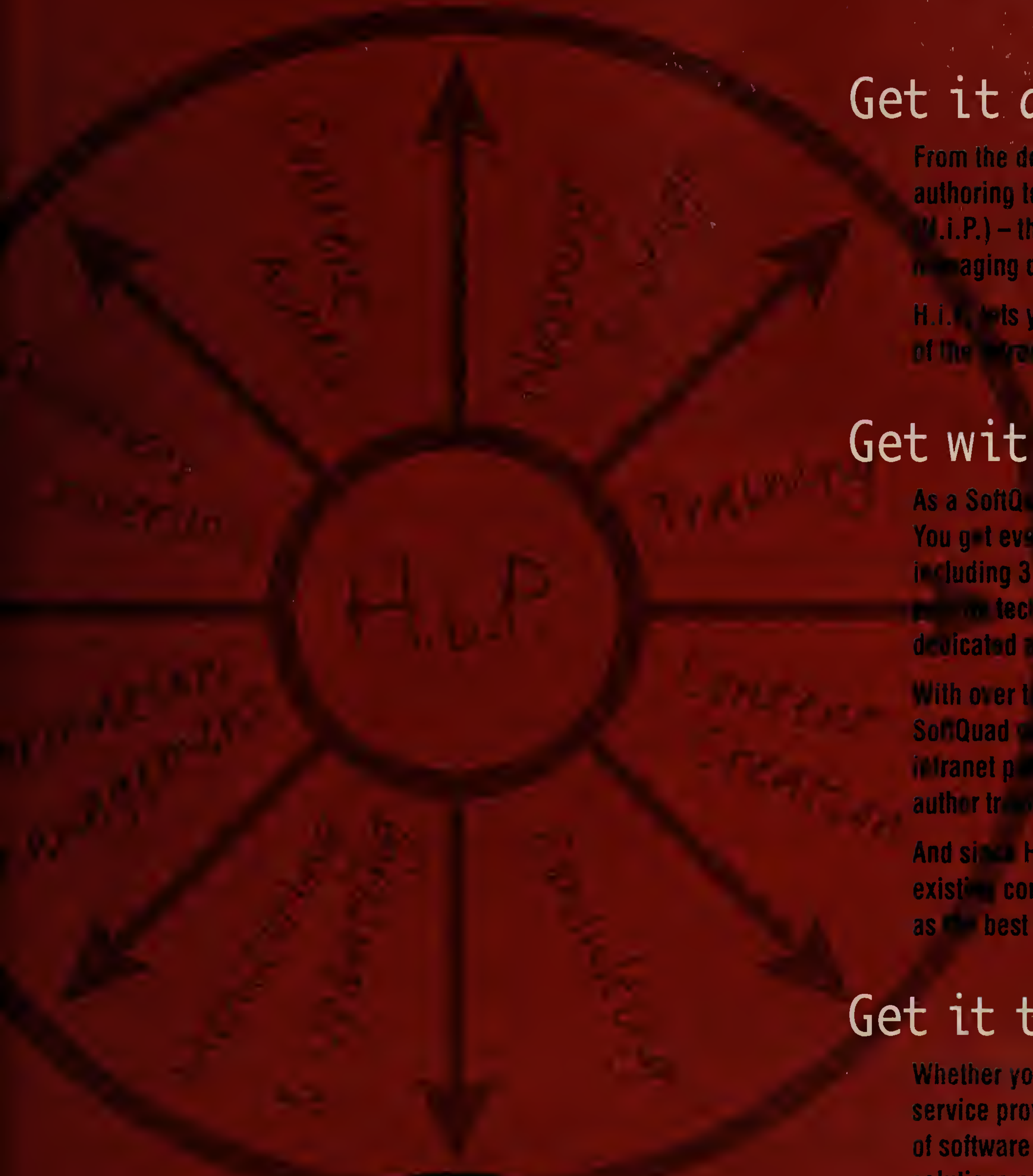

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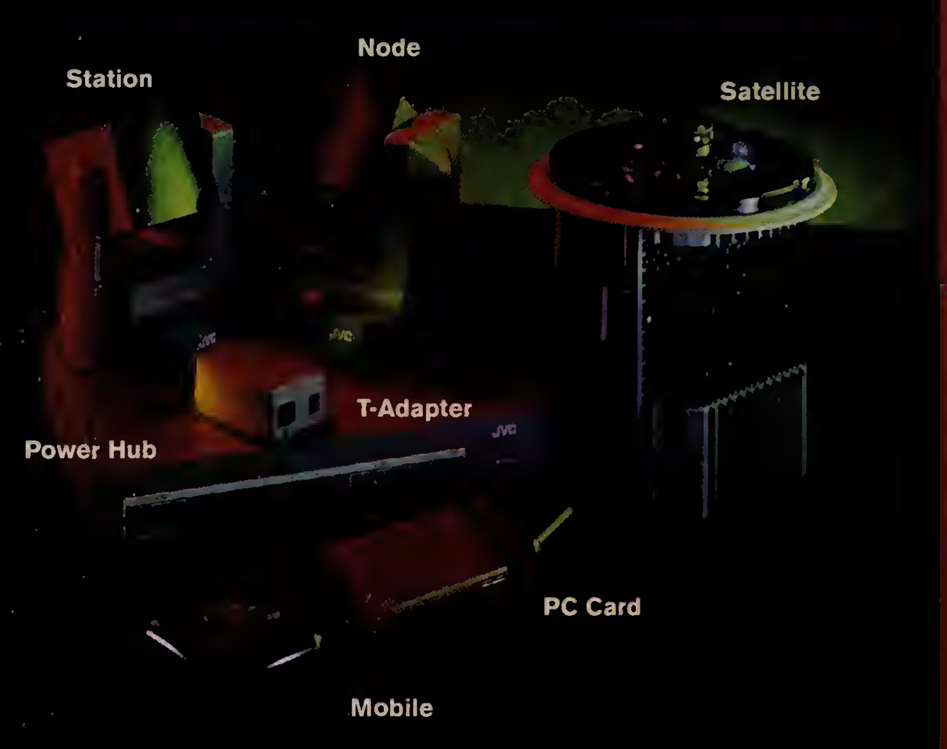
Circle Reader Service #34

VIPSLAN-10

NOW YOU HAVE A NEW CHOICE WHEN INSTALLING A LAN SYSTEM

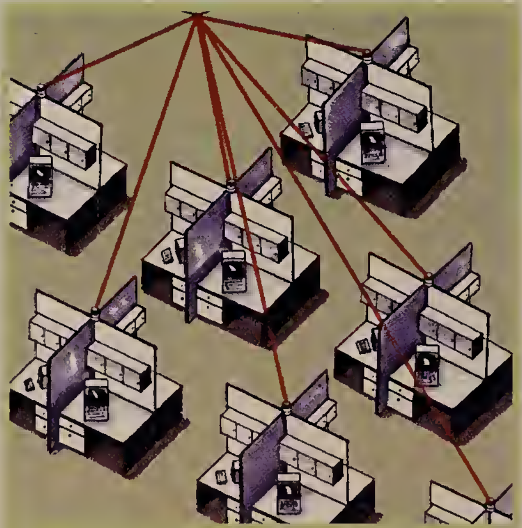


Introducing VIPSLAN-10: 10Mbps Ethernet Compatible Infrared Wireless LAN System — Bringing a New Level of Ease to LAN Installation

Network managers have a new option when configuring 10Mbps Ethernet compatible LAN installations: VIPSLAN-10, designed for environments where wireless connectivity makes sense. Ideal as an addition to existing wired installations, VIPSLAN-10 is perfect for temporary workgroups, facilities, or immediate installation requirements. Or, use VIPSLAN-10 in manufacturing facilities, warehouses, older buildings and other situations which don't lend themselves to traditional wiring.

A LAN Without Limits

No special software, gateways or protocol setup required. With VIPSLAN-10 your data transmission is secure and completely Ethernet compliant. And only VIPSLAN-10 provides servo-controlled infrared beam adjustment and signal-locking features.



__VIPSLAN-10__ is ideal for temporary LAN requirements and situations which don't lend themselves to traditional wiring, such as: temporary workgroups, manufacturing facilities, warehouses and older buildings.

The VIPSLAN-10 system—which can be installed in as little as four hours— is comprised of six optional components. The three primary configurations are:

1. 360° ceiling-mounted Satellite–Node configuration supporting multiple users
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yes
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Briefs

■ **Technically Elite, Inc.,** *a Remote Monitoring (RMON) vendor in San Jose, Calif., last week said* **Gigabit Ethernet** *start-up* **Rapid City Communications** *has licensed its RMON agent technology. By integrating Technically Elite's MeterWorks RMON source code in its soon-to-be-released 1G bit/sec Ethernet Layer 3 switches, Rapid City could be one of the first vendors to market with high-speed switches that include support for RMON on every port.*

Technically Elite: (800) 474-7888; Rapid City: (415) 937-1370.

■ *The* **Wireless LAN Interoperability (WLI) Forum** *has announced* **a draft wireless LAN interface specification** *to encourage vendors to build compatible products. The draft is now under review by the IEEE 802.11 subcomittee. The WLI Forum expects final approval of the spec in 1997.*

In other news, the forum added seven companies, bringing its member count to over 20 mobile computing and wireless LAN vendors.

New WLI Forum members:

- ▶ Andrew
- ▶ Bass
- ▶ BreezeCom
- ▶ Fujitsu
- ▶ Intermec
- ▶ Nomadic
- ▶ WaveNet

For more information, contact WLI Forum Secretary Brian Button of Proxim, Inc. at (415) 526-3691, or WLI Forum Chairman Jeff Tingley of Data General Corp. at (508) 898-6002.

■ **D-Link Systems, Inc.,** *an Ethernet workgroup hub maker in Irvine, Calif., has rolled out two* **stackable 12-port Fast Ethernet hubs.** *The only difference between the devices is that one offers SNMP management capabilities while the other is unmanaged. Pricing for the intelligent device is $2,195, and the unmanaged hub costs $1,795.*

D-Link: (800) 326-1688.

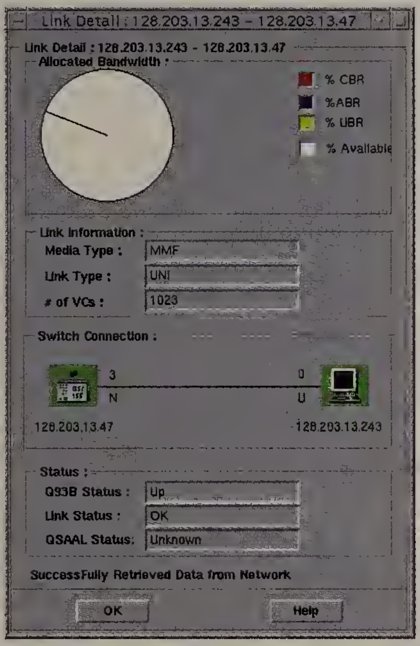
UB makes ATM more manageable

ATMView will support ATM gear from UB and others.

By Jodi Cohen
Santa Clara, Calif.

UB Networks, Inc. last week rolled out its first graphical-based tool for managing multivendor ATM networks from end to end.

The application, dubbed ATMView, simplifies the task of configuring and monitoring ATM networks and emulated LANs. The software provides fault and connection management, traffic analysis, congestion control and bandwidth allocation based on quality-of-service parameters.


Link Detail : 128.203.13.243 - 128.203.13.47

Link Detail : 128.203.13.243 - 128.203.13.47

Allocated Bandwidth :

Link Information :
Media Type : MMF
Link Type : UNI
# of VCs : 1023

Switch Connection :

Status :
Q93B Status : Up
Link Status : OK
QSAAL Status: Unknown

SuccessFully Retrieved Data from Network

UB's *ATMView provides net administrators with traffic management capabilities, including congestion analysis, link status information and bandwidth dispersion based on qaulity-of-service parameters.*

With these features, ATMView brings some much-needed sophistication to the world of ATM net management, industry observers said.

"If you ask somebody what's the worst thing about ATM, they will always say network management," said Lawrence Gasman, president of Communications Industry Researchers, Inc., a market research firm based in Charlottesville, Va. "But UB is taking it to the next level by providing higher level features that ATM users will no doubt perk up their ears at."

One highlight is ATMView's ability to help simplify the cumbersome task of setting up permanent virtual circuits and switched virutal circuits by allowing net managers to configure and trace them via a simple graphical user interface.

See **UB Networks,** *page 38*

Microsoft tunes up its Memphis operating system

By Christine Burns
Long Beach, Calif.

Microsoft Corp. says its follow-up to the Windows 95 operating system will support a wider array of high-speed hardware platforms, have built-in Internet access and help lower PC management costs.

The software — code-named Memphis — was recently previewed by company officials for a field of 3,500 third-party software developers here. The Windows 95 32-bit client operating system was introduced more than a year ago with much fanfare and needs to be improved in order to be more widely deployed throughout enterprise networks.

Memphis is expected to be commercially available in late 1997 or early 1998.

Microsoft will focus on supporting high-speed hardware platforms such as the Universal Serial Bus and advanced graphics buses. This support is necessary, given that graphics-intensive multimedia applications are driving demand for faster hardware.

Memphis will also ship with a common device driver model, allowing vendors to write a driver that will let both Windows 95 and Windows NT 32-bit operating systems run on their hardware.

The network features users can expect with Memphis include the option of using Microsoft's Internet Explorer to browse for resources and files on their own machine.

"We are not going to force

See **Memphis,** *page 39*

ATM and switched Ethernet float cruise line's boat

Net technology to support multimedia and mundane apps.

By Jodi Cohen

John Masseria's job is to ensure smooth sailing for the network aboard the Carnival Cruise Lines' new Destiny ship.

After evaluating several network technologies this past summer, Carnival's manager of systems support and information systems decided to outfit the world's largest cruise ship with a switched Ethernet network that feeds an ATM backbone.

"ATM was a good fit for the Destiny, which is both a floating office that supports basic E-mail and word processing applications, and a state-of-the-art entertainment facility that provides multimedia apps like interactive TV and virtual reality games," Masseria said.

But the decision to bet the boat on ATM was not immediately apparent. Most vendors —including Bay Networks, Inc. and Cisco Systems, Inc. — lacked an adequate ATM story and instead pitched switched Fast Ethernet or FDDI backbone solutions, Masseria said. Even ATM pioneer FORE Systems, Inc. came up short in the areas of sufficient port density and redundant ATM connections, he said.

"It was 3Com [Corp.] that opened our eyes to ATM," Masseria said. "And the more we learned about ATM, the more we liked it."

In addition to running E-mail, spreadsheet and other typical office applications, the Destiny network supports a host of multimedia applications. These include interactive TV, virtual reality games and casino gambling, all of which benefit from ATM's speed and quality-of-service features.

Masseria, however, chose not to extend ATM all the way to the desktop and instead went with less costly switched Ethernet desktop links. He still plans to run ATM multimedia applications over Ethernet using Cells in Frames (CIF) technology. He is also eager to see a soon-to-be-released demo version of CIF software for 3Com's Ethernet-to-ATM edge switches.

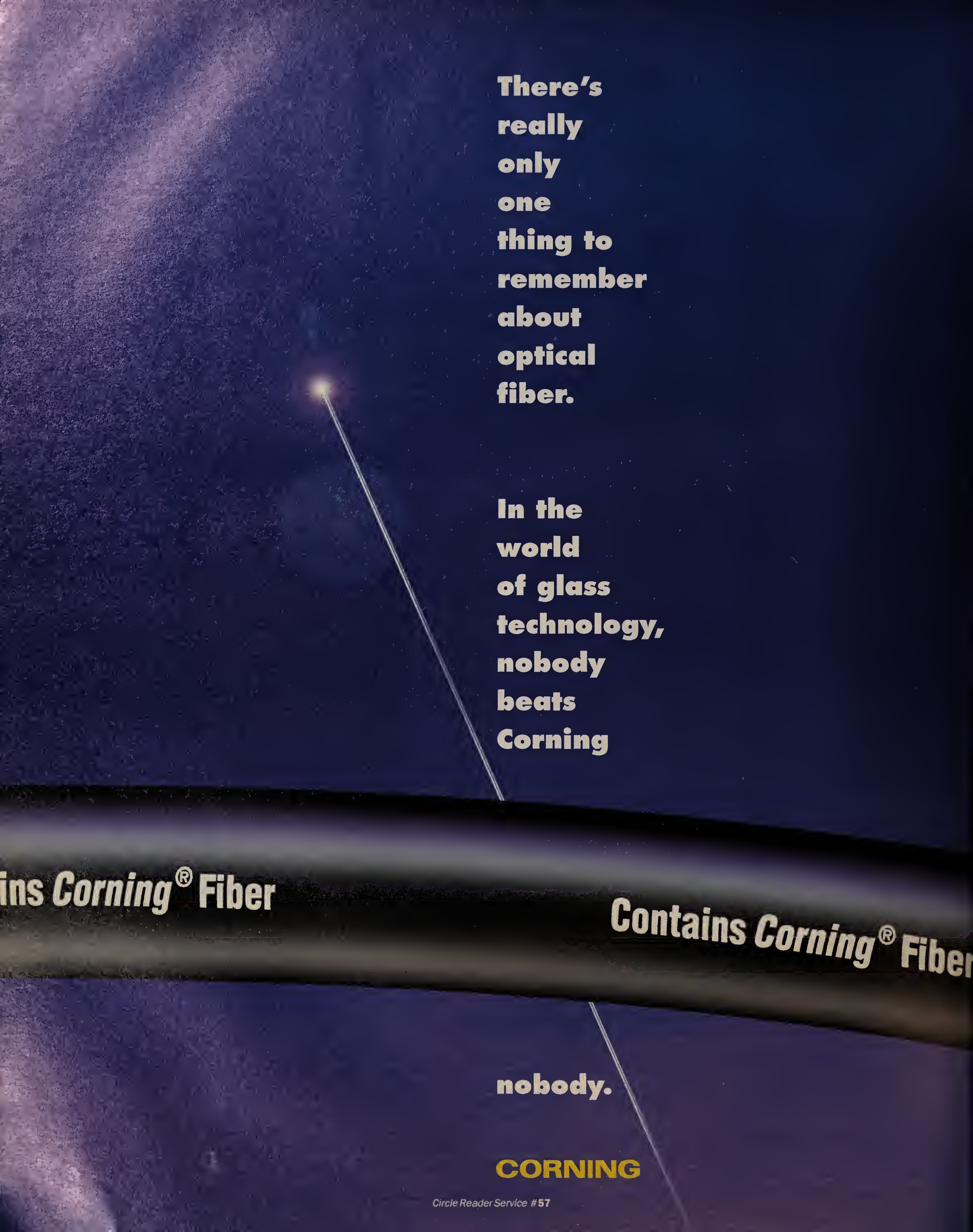
Vacation LAN

For now, the Destiny's 350-user IP and IPX network, which has been up and running for about a month, supports a total of six Cellplex 7000 ATM backbone switches as well as nine SuperStack II Switch 2700 Ethernet-to-ATM workgroup devices. Also, at the network edge sits a Cisco router, which hangs off one of the Ethernet ports on a Cellplex, for satellite and ship-to-shore links.

Masseria stationed two 7000s in the ship's data center and four in the high-traffic purser's office and dining areas.

Some of the data center Cellplex switches are fully populated with eight 7200 modules, providing 96 switched 10M bit/sec Ethernet links and 24 155M bit/sec ATM connections. Others support 3Com's 16-port Fast Ethernet 7600 switch module or the 36-port Ethernet-to-ATM 7400 card.

See **Carnival,** *page 38*



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really
only
one
thing to
remember
about
optical
fiber.

In the
world
of glass
technology,
nobody
beats
Corning

nobody.

CORNING

*Circle Reader Service #***57**

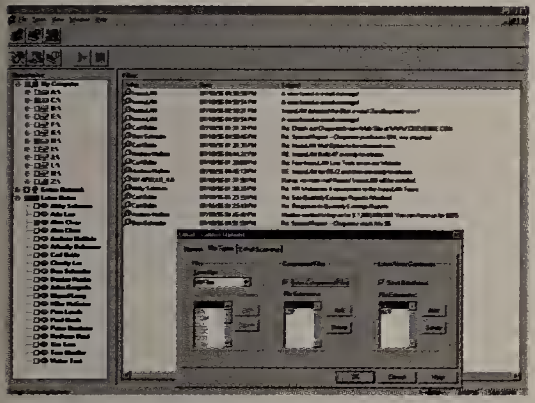
Cheyenne package ferrets out viruses in groupware systems

By John Robinson
Roslyn Heights, N.Y.

Cheyenne Software, Inc. this week will christen a software suite that couples virus protection and data backup for groupware applications.

The Cheyenne Protection Suite, to be introduced at Comdex/Fall '96, supports Lotus Development Corp.'s Notes, Microsoft Corp.'s Exchange Server and Novell, Inc.'s GroupWise messaging servers.

The suite includes Cheyenne's ARCserve 6 backup product and InocuLAN 4 virus protection software, as well as backup and antivirus agents for each messaging system.



The Cheyenne AntiVirus agent *can scan mailboxes and databases, as administered in this screen for Lotus Notes.*

The company's AntiVirus agents work with InocuLAN to scan messaging server databases for infected documents, such as Microsoft Word file attachments that can serve as hosts for macro viruses.

Cheyenne rival McAfee late last month announced its own antivirus products for groupware — GroupScan for clients and GroupShield for servers (*NW*, Oct. 28, page 11). Initially, the offerings work with Notes.

Both companies claim to be the first to market with antivirus products for groupware, but one analyst called Cheyenne's Protection Suite a more complete antivirus offering because of the integrated backup application.

"Having a backup product without integrated antivirus protection could cause you problems," said Rob Enderle, an analyst with Giga Information Group in Santa Clara, Calif. "A backup event could back up a virus before the antivirus [software] catches it. . .and a backup could damage a virus scan if both were going on [independently]."

But Scott Gordon, senior product manager for McAfee, disagreed.

"With [GroupShield], you leave it on. It scans for viruses while a backup application is running," Gordon said, adding that McAfee's antivirus products can run with a variety of backup applications.

The Protection Suite for Microsoft Exchange Server and Protection Suite for Lotus Notes, both for Windows NT, are shipping now and cost $2,495. Protection Suite for Lotus Notes for OS/2, scheduled for release in December, is priced at $1,295.

Protection Suite for Novell GroupWise for NetWare will be available in the first quarter of next year. Pricing was not available.

©Cheyenne: (800) 243-9462.

Xerox expands on management of net peripherals

By Christine Burns
Las Vegas

Xerox Corp. this week will demonstrate extensions to its CentreWare network peripheral management software that support multiple LAN environments and Internet technologies.

CentreWare, which was first rolled out last fall with the introduction of Xerox's Document Centre line of digital office products, is a Windows application that lets end users manage concurrent print, copy, scan and fax jobs from their desktops. CentreWare can manage, track and abort these jobs on Document Centre machines, Hewlett-Packard Co. printers and any other network peripheral running an HP JetDirect network adapter card.

While CentreWare currently only runs over NetWare 3.X and 4.X, Xerox will demonstrate support for Windows NT 3.X and 4.0, IBM Warp Server and Banyan Systems, Inc. VINES environments. Xerox has also upgraded the client software to support the 32-bit Windows 95, Windows NT and OS/2 operating systems.

"Basically, we are bringing printing job management to every desktop over any network protocol," said Jim Lundy, Xerox product marketing manager.

To expand this peripheral management support beyond the LAN, Xerox will show its new CentreWare for the Internet software. Through support for TCP/IP and HTTP, it will let end users and administrators monitor jobs and send them to peripherals anywhere via a standard Web browser.

This client software will either be a plug-in to Netscape Communications Corp.'s Navigator or an ActiveX control for Microsoft Corp.'s Internet Explorer.

Beta testing for the increased LAN support and Web client will begin by year-end, company officials said.

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Novell makes its NT client more manageable

By Christine Burns
Orem, Utah

Novell, Inc. has begun shipping revised Windows NT client software that is significantly more manageable.

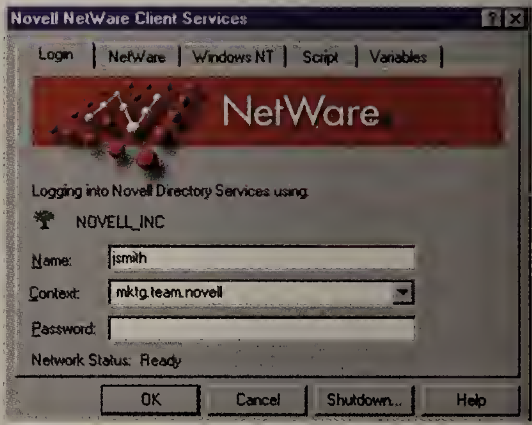
The new 32-bit IntranetWare Client for Windows NT — Novell's second attempt at client software that ties Windows NT workstation users to NetWare/IntranetWare services — includes support for Windows NT 4.0 machines and gives end users easier access to all Novell services.

For administrators, the new client software paves the way for direct NT workstation administration through Novell Directory Services (NDS).

"This client is heads above the previous version because it actually lets NT boxes be managed within the NetWare environment," said Jeff Rosen, technical manager with Blue Cross/Blue Shield of Illinois in Chicago, which has tested the software on a dozen workstations.

Features directly benefiting end users include access to IntranetWare services using TCP/IP and coexistance with Microsoft's peer-to-peer service for getting to data and services on other NT machines. Additionally, this client supports autoreconnection to resources in the event of network failure.

The new client also ships with an updated version of Novell's Application Launcher (NAL), a utility that lets an administrator manage network-based Windows applications and gives end users location-independent access to those programs. The previous version of Novell's NT client did not support NAL.



Logging into Novell Directory Services using
NOVELL_INC
Name: jsmith
Context: mktg.team.novell
Password:
Network Status: Ready

The latest release *of Novell's 32-bit IntanetWare Client for Windows NT gives users one logon to the secure NT workstation and IntranetWare services.*

New features in NAL 1.1 include a folder system for organizing networked applications on the desktop and a fault tolerance feature on the server.

The IntranetWare Client for NT will also include support for Novell's Automatic Client Update, a utility that lets administrators update NT client software across the net. Another new feature is synchronization between NT workstation user identification and passwords with those used to access networked resources.

Also, Novell announced beta software called Workstation Manager that lets net managers centrally create and administer user accounts. Without Workstation Manager, administrators must physically go to each NT workstation to initiate user access to network services, or install an NT Server machine and set up an NT domain to manage multiple NT workstations.

"We are primarily a Novell shop, so maintaining an NT Server just to provide a dozen users NT workstations is both a hassle and an added cost that we can certainly live without," said Blue Cross/Blue Shield's Rosen, whose NetWare 4.1 network has a total of 3,000 users.

Workstation Manager beta software will be available later this year.

Novell's 32-bit IntranetWare Client for Windows NT can be downloaded for free from Novell's Web site (http://support.novell.com/home/).

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Ergotron's new LANSCAPE Organizer 3000 systematically organizes your equipment, regardless of size or location. Stylish, rugged construction organizes over 3,000 lbs. of hardware in less than eight square feet – maximizing component accessibility in a minimum footprint.

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Carnival

Continued from page 33

The 7600 modules provide 100M bit/sec connections to server farms — consisting of three Compaq Computer Corp. 5000 servers running SCO Unix, two NetWare and two NT servers. The 7400 modules provide dedicated Ethernet links to officers' cabins and the bridge, and 155M bit/sec ATM backbone connections.

In addition, the ship's six wiring closets contain nine 2700 switches, each of which has a single 155M bit/sec ATM interface and 12 dedicated Ethernet ports for workstation connections around the ship.

The net supports applications such as fulfillment of guest meal orders, which are submitted at 84 PCs in the ship's wait stations and travel via 10M bit/sec Ethernet to a dining room Cellplex 7000. The orders then zip to another 7000 in the data center over a 155M bit/sec ATM link. The backbone Cellplex then delivers the data to Compaq 5000 Unix-based servers, which transfer the order across the ATM backbone to a 2700 Ethernet-to-ATM switch. The 2700 completes the process by sending the order via dedicated switched 10M bit/sec Ethernet to each workstation in the kitchen, Masseria explained.

"The ATM network expedites food service for thousands of guests," Masseria said. "It also lets us track what people are ordering so we can add or delete menu items and better monitor our inventory."

Looking forward, Masseria would like to see more distributed management applications built into 3Com's Transcend Enterprise Manager that would allow a station on the ship to collect statistics and then report back to a central console at Carnival headquarters.

Also, he is waiting for Multi-Protocol over ATM to be standardized so he can move forward with the deployment of virtual LANs, as well as CIF technology to become available for running multimedia applications over Ethernet. ■

UB Networks

Continued from page 33

"Instead of having to know all of the [media access control] and node addresses, and physically typing them in, ATMView will let me just point and click on devices in order to set up a virtual connection," said UB customer Dan Howard, director of MIS at Express Scripts, Inc., a pharmacy benefits management company in St. Louis. "That's a lot easier and will probably save me some time."

Grab more info, including:

- An ATM tutorial
- A paper on SNMP management of ATM nets
- Overviews of ATM LAN emulation issues

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http://www.nwfusion.com

ATMView runs on Hewlett-Packard Co.'s OpenView and UB's NetDirector net management platforms. It discovers ATM switches across a network and displays icons for UB's GeoSwitch and GeoLink, and third-party ATM devices that support the AToM Management Information Base (MIB), an SNMP MIB for ATM.

Gasman, however, doubted that customers of competitors' ATM gear will opt for UB's ATMView. "If you buy a FORE [Systems, Inc.] switch, you aren't going to buy a UB net management system," he said. "But third-party support would play a role if a user has ATM equipment installed from multiple vendors."

ATMView is priced at $3,995 and will be available in December for SunSoft, Inc.'s Solaris and HP's HP-UX platforms, with support for Windows NT available in early 1997. Also, UB will provide a Web-based interface for ATMView in the first half of next year.

ⒸUB: (408) 496-0111.

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Circle Reader Service #60

Memphis

Continued from page 33

either [the Memphis or Internet Explorer] user interface on anybody, but the option to stay inside the Internet browser to look at what is on your local machine will be useful to a lot of people," said Phil Holden, a product manager with Microsoft's Desktop and Business Systems Division.

Memphis will also better meet customers' Internet needs via built-in support for NetMeeting, Microsoft's Internet conferencing and collaboration software.

Microsoft is also taking care to make its client software more manageable in network environments. This is in line with Microsoft's recently announced Zero Adminstration Initiative for Windows, a project that focuses on lowering the cost of owning Windows-based PCs. Memphis and the next release of Windows NT Workstation will include client-side support for this initiative.

For example, Memphis will support automatic system updates so that when the computer is booted, the operating system without user intervention will seek the latest code and drivers from a designated LAN or intranet server. Additionally, Memphis will support centralized administration of all aspects of the client system and give managers the option of "locking down" a PC, preventing any software not designated by the administrator from being installed on it. Memphis will go into beta in the first quarter of next year. While declining to give a release date, Holden did say the Memphis beta cycle will most likely be long.

©Microsoft: (206) 882-8080.

WINDOWS CLIENTS OVER TIME

Microsoft has plans to keep producing a steady flow of client software.

August 1995
Windows 95, including Internet Explorer browser

December 1995
Windows 95 Service Pack 1

May 1996
Windows 95 OEM Service Pack

August 1996
Internet Explorer 3.0

September 1996
Windows NT Workstation 4.0

Early 1997
Internet Explorer 4.0

Early 1997
Memphis beta

Mid-1997
Windows NT Workstation 5.0 beta

Early 1998
Windows NT Workstation 5.0

BusinessBriefs

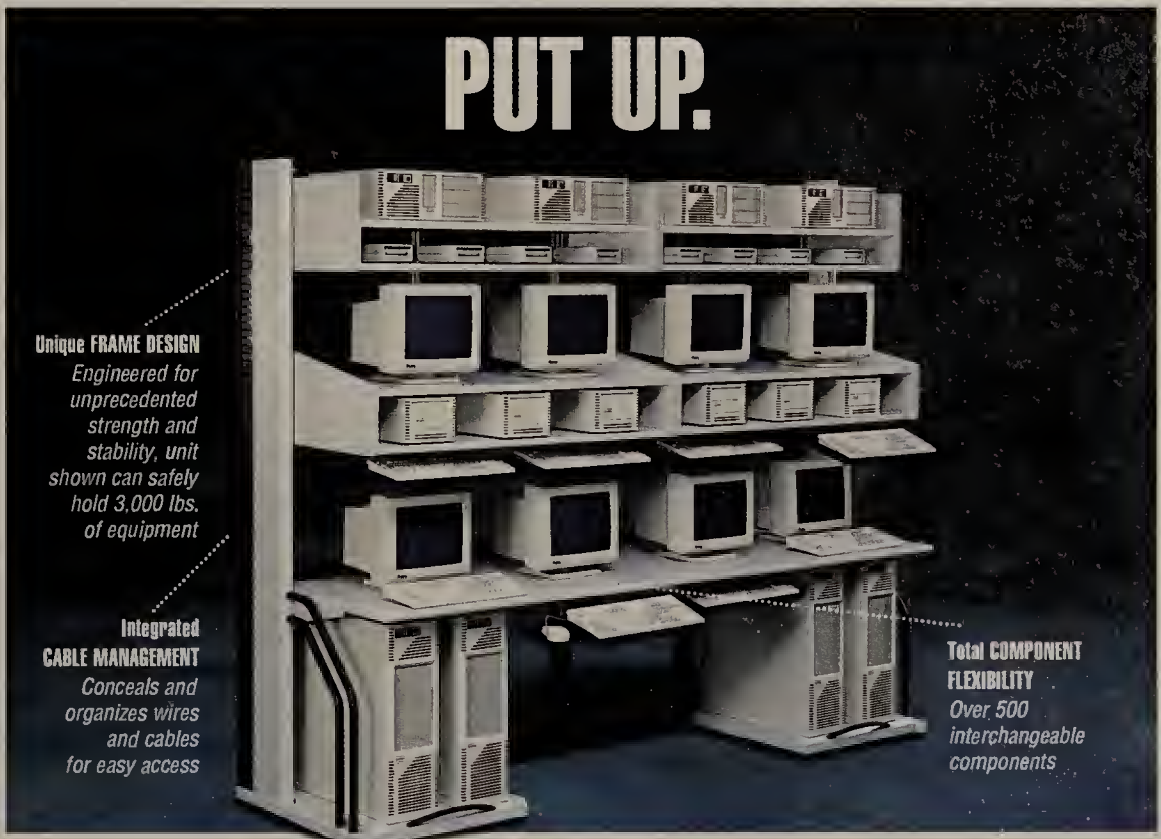
LAN switch provider **Network Peripherals, Inc. (NPI)** reported record revenue of $14.1 million for the third quarter ended Sept. 30, a 45% increase over the comparable period last year. Pauline Lo Alker, NPI's president and chief executive officer, attributed the company's success to Fast Ethernet product sales, which grew 62% from the previous quarter to $3.4 million. Earnings for the third quarter were $476,000.

For the nine months ended Sept. 30, the company reported revenue of $37 million and a net loss of $12.6 million, which was due in part to costs associated with buying NuCom Systems, Inc.

Joel Kocher, president and chief operating officer of Tucson, Ariz.-based **Artisoft, Inc.,** has left the company to join **Power Computing Corp.,** an Austin, Texas-based manufacturer of MacOS systems. Kocher will serve as president and chief operating officer there.

Before joining LANtastic vendor Artisoft in 1994, Kocher served as president of worldwide sales for Dell Computer Corp.

Power Computing last week also announced that **Todd Osborn,** formerly a vice president at Gateway 2000, Inc., has joined the company as senior vice president of sales.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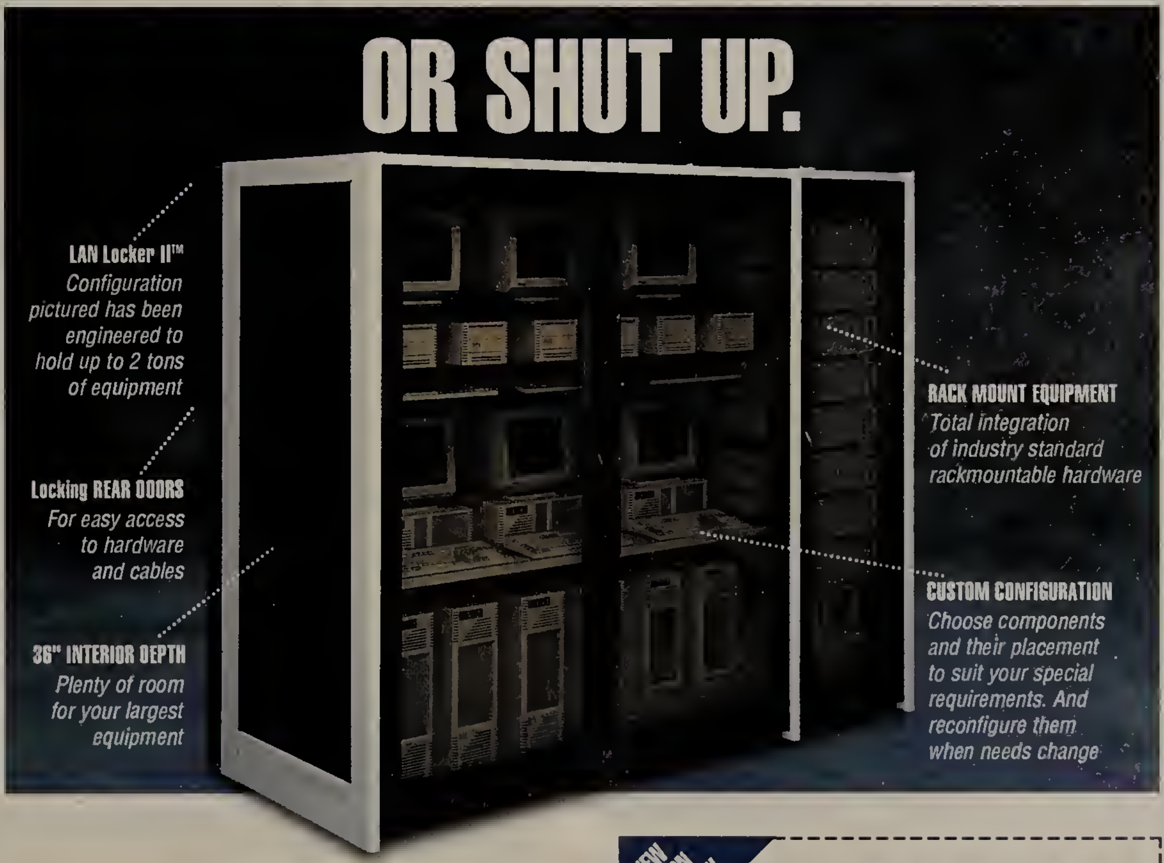
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WIRED WINDOWS

Surprise! Microsoft may have NC edge

Regular readers of this column know that I view the network computer (NC), as specified by Oracle Corp. CEO Larry Ellison, as a last-gasp effort by Oracle and others to forestall Microsoft Corp.'s dominance of the desktop as well as the client portion of the Internet and intranets.

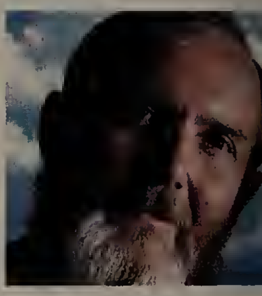
The specification itself is so broad as to include PCs already on the desktop, but so narrow that there's no provision for a video component.

Ironically, it is Microsoft that has developed a product that not only is suitable for all NC applications — thin desktop client, network application storage and even television set-top boxes — but could finally deliver on the promise that Apple Computer, Inc. squandered with the Newton.

Microsoft has defined a new hardware platform called the Handheld PC (HPC), which looks a lot like a personal digital assistant, except it has a keyboard. It will also have office productivity applications — E-mail, a Web browser and what Microsoft is calling "companion applications" for its standard Office suite products.

The operating system for these devices is called Windows CE. It has the familiar Windows 95 interface and comes with the basic applications, including Internet Explorer. The specification also calls for infrared connectivity to the desktop for file transfer as well as an internal or PCMCIA modem for dial-up network and Internet connectivity.

While further explanation of the companion applications is still awaited, it could be expected that at least a minimal Microsoft Word and Excel viewer and editor would be included. The Java-enabled Internet Explorer would also allow the HPC user to make full use of Web-enabled applications.



Dave Kearns

The small footprint, the connectivity and the applications, all coupled with a $500 to $1,000 price outdo Ellison's NC in just about any comparison. The real clincher, though, is the potential.

The HPC, as designed, is only slightly larger than today's multipurpose TV/VCR/cable remote control device — and it's intelligent. It could download via the infrared link all cable programming for a day, week or month, allow you to sort and browse it in any fashion, then program what you want to watch and/or record.

Beyond television, the HPC becomes your browser for Web-enabled TV, or throw the picture onto the big screen to share with others in the room. Play interactive games.

It will take a bit of imaginative marketing and lots of arm-twisting by Microsoft to get developers to create content for the HPC, but this looks like the last battle for the operating system — and it looks like Microsoft will win.

Tip of the week

Server crashes caused by sending oversized ping packets is a real concern. For information about the problem, methods of protection and servers that are susceptible to such attacks, visit http://www.sophist.demon.co.uk/ping.

Kearns, a former network administrator, is a freelance writer and consultant in Austin, Texas. He can be reached at dkearns@msn.com.

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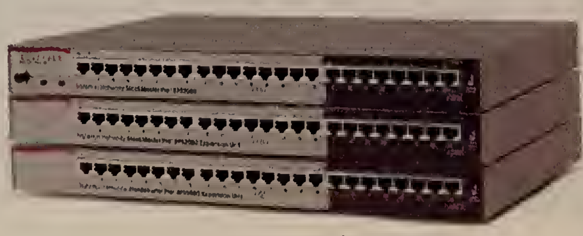

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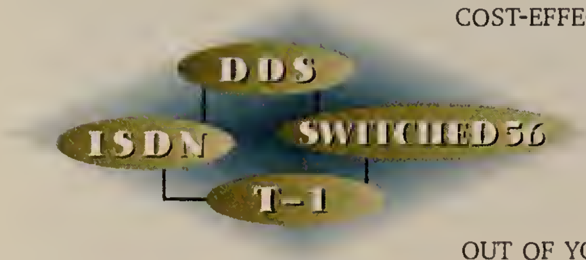

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Circle Reader Service #21

Briefs

■ **Precept Software, Inc.** *last week issued a tool that will let customers and vendors test the impact of the* **Resource Reservation Protocol (RSVP)** *on the performance of their networks and products.*

In addition, the company announced Windows 95 and Windows NT development kits for software vendors that want to build RSVP support into their applications. RSVP lets applications reserve routes across busy IP nets that have a particular quality of service. The test software is priced at $995 for a five-node license, while the development kits start at $20,000.

Precept: (415) 845-5200.

■ **Information Builders, Inc. (IBI)** *in New York recently unveiled SmartMart, a set of products and services for quickly creating a small-scale data warehouse, usually called a* **data mart.** *The products include tools for database creation, as well as data extraction and transformation. Also part of SmartMart are business analysis tools, administrative programs and a multidimensional database. SmartMart is available in various packages for Unix platforms, Windows NT and Alpha VMS.*

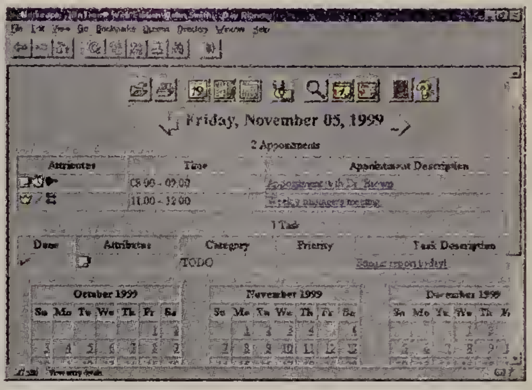
The complete package, including consulting services, will be available in the first quarter of 1997, starting at $76,400 on NT.

IBI: (212) 736-4433.

■ **Level 8 Systems, Inc.** *demonstrated at the Microsoft Professional Developers Conference earlier this month the beta version of its gateway software for* **Microsoft Corp.'s Falcon messaging middleware,** *which also entered beta testing recently. Falcon is designed as a transactional messaging system for Windows NT and Windows 95 applications. The Level 8 gateways will interconnect non-Microsoft messaging systems, such as IBM's MQSeries, with Falcon. No release date has been announced. Users interested in the beta program can contact Sam Somech from Level 8 at (212) 244-1234.*

Campbell stays up-to-date, adds Web hooks to calendaring tool

OnTime 4.0 allows users to tap into group schedules through their Web browsers.



OnTime Web Edition *lets end users view their calendars from a Web browser, as well as set up appointments and keep track of tasks.*

By Barb Cole
Southfield, Mich.

Campbell Services, Inc. last week announced an updated version of its calendaring and scheduling software that includes a component for accessing the product via Web browsers.

The company's OnTime Web Edition, released in conjunction with OnTime 4.0, lets users view their calendars from a Web browser as well as set up appointments, keep track of tasks and schedule group meetings across the Internet. The Web Edition runs as a Common Gateway Interface application on Windows NT-based Web servers.

The new Web hooks will benefit companies such as Union Bank of Switzerland, which has branch offices throughout Europe that are not connected to the company's WAN. The Internet-accessible scheduling software ensures that everyone can be included in the group scheduling process regardless of their client operating system, said Pietro Brossi, a network administrator at Union Bank.

OnTime 4.0 also includes a new Windows tool that lets administrators move end users from one server to another using a drag-and-drop procedure. "The software takes care of all the details, like copying the contents of folders and maintaining links," said Anik Ganguly, president of Campbell Services.

Version 4.0 is the first edition of OnTime to support Windows NT servers, and it has a re-vamped Macintosh client. The Windows client also has been enhanced so it can send notifications via Simple Mail Transfer Protocol-compliant mail systems. The new version now supports embedded URLs so users can employ the Internet or company intranet-based documents to distribute agendas and meeting minutes.

In addition to Windows NT servers, the software runs on Unix, Novell, Inc.'s NetWare and Banyan Systems, Inc.'s VINES.

Pricing for OnTime 4.0 runs from $56 per user for 100 users to $40 per user for over 5,000 users.

©Campbell Services: (800) 345-6747.

Visit Network World Fusion for a list of Web-enabled calendaring apps.

Enter the number to the right in the DocFinder box on the home page.

FIND IT ON FUSION 5054

Network World Fusion

British Aerospace gets huge CORBA project off ground

By Ron Condon
London

A British aircraft manufacturer has started a project to reengineer all of its information systems based on object-oriented technology.

When completed, the system will be the largest in the world based on Common Object Request Broker Architecture (CORBA), according to the Object Management Group, which controls the standard object technology.

British Aerospace Airbus (BAA) has started with a three-month pilot study to test the feasibility of using an ORB to coordinate the interworking of its applications. If the study is successful, the company plans to roll the system out to all of its 4,000 end users over a five-year period.

According to Joe Schechter, head of IT at the company, the technology will enable systems to develop organically and will provide more flexibility.

"We are not a greenfield site.

See **BAA,** *page 48*

Fabrik weaves E-mail connectivity service

By Barb Cole
San Francisco

Fabrik Communications, Inc. last week announced a virtual private network (VPN) service for companies looking to connect their E-mail networks with those of their trading partners.

With Fabrik VPN, companies and organizations with whom they do business can hook up their existing mail systems in a virtual private LAN. The service supports can link Lotus Development Corp. cc:Mail and Notes, Microsoft Corp. Mail and Exchange, as well as Novell, Inc. GroupWise messaging systems. The service does not require installation of additional hardware or software at the customer sites.

Fabrik VPN is aimed at companies that want to avoid sending sensitive or time-critical information via the public Internet, said Christopher Logan, Fabrik's chief executive officer.

In addition to handling the exchange of messages and attachments, Fabrik VPN screens them for viruses. The service also has a feature, dubbed Fabrik Registered Messaging, that lets users track mail from departure to destination.

The service may appeal to companies that do not have the personnel to maintain the Internet hooks and gateways needed to translate messages among mail systems. Fabrik is hoping some customers will sign on just to avoid dealing with the immature and problematic crop of Simple Mail Transfer Protocol gateways available today.

Fabrik VPN will appeal to companies that wish to have a reliable and secure E-mail connection to their business partners, said Tim Sloane, an analyst at Aberdeen Group, Inc., a market research company in Boston.

"A lot of companies are tired of having their binary objects not go through over Internet messaging systems," he said. "While a glitch like that may not cost a company any revenue, it doesn't improve their image with a business partner."

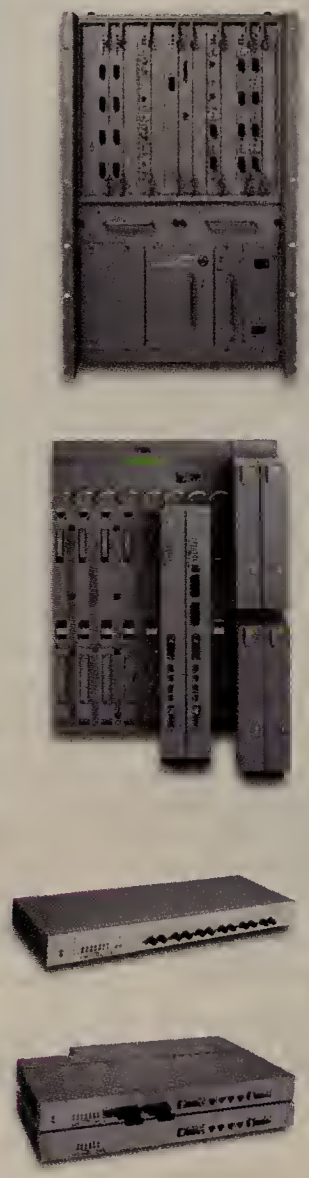
Fabrik has experience in the mail outsourcing space. The company already offers Fabrik Connect, a service that connects LAN and client/server E-mail systems to the Internet.

Pricing for Fabrik VPN is $50 per month per connection, plus a message charge of 30 to 50 cents per message and a nominal fee for attachments. The service will be available next month in limited release.

©Fabrik: (415) 439-6600.

WHY OUTSOURCE E-MAIL?

The annual maintenance costs for E-mail systems average more than $4,000 per end user, including software, hardware and network costs, according to consultancy Creative Networks of Palo Alto, Calif.



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Oracle fleshes out network computer product strategy

Company also reveals Java-based applications and EC server.

By Elinor Mills
San Francisco

Oracle Corp.'s OpenWorld '96 conference earlier this month was more like "Network Computer World '96," as the software giant touted its vision of low-cost desktop devices that rely wholly on servers for applications.

Oracle *CEO Larry Ellison continues to rally support for the network computer.*

Company President and Chief Executive Officer Larry Ellison, with the zeal of an evangelist, demonstrated prototype network computer (NC) devices at the event here. These included versions based on Advanced RISC Machines, Ltd. (ARM) and Intel Corp. microprocessors, running Netscape Communications Corp.'s Navigator Web browser and equipped with an SVGAQ monitor displaying a customized desktop screen with links to news, weather and other information.

An Intel version of the NC will be finished by year-end and will be available in the first quarter of 1997, Ellison said. An NC server will be available by year-end, and ARM-based devices are already shipping, he said.

Ellison took repeated jabs at Intel and Microsoft Corp. for resisting what he called a paradigm shift to lower cost, less complex network-centric appliances.

"We will never move to the information age if we have to rely on the PC to get us there," he said. "People can't afford them and don't understand how to use them. The NC is a communication and information access device, not a computation device."

Office NCs will cost between $200 and $800. Home NCs will cost nothing for the hardware, but users will pay a monthly fee for network use, according to Ellison. Apple Computer, Inc. and WebTV Networks, Inc. are developing devices for offices and schools, and IBM and Sun Microsystems, Inc. are working on models for corporate use, he added.

Oracle also announced a slew of new products and services based around its Network Computing Architecture.

Happenings at Oracle's OpenWorld

- Announced the Intel version of its NC will be available Q1 of 1997
- Released Payment Server
- Announced HatTrick, a Java-based program, to be included in Oracle's InterOffice 4.1 groupware suite
- Unveiled Oracle WebServer 2.1
- Said it will Web-enable all 30 modules in its client/server applications suite

HatTrick features a Java-based word processor, spreadsheet and graphics software program that can be downloaded over a network. HatTrick will be included in Oracle's InterOffice 4.1 groupware suite. The word processor and presentation software will ship in the first quarter of 1997, and the spreadsheet will ship in the second quarter of 1997. Pricing has not been announced.

The company also unveiled Oracle WebServer 2.1, which provides a common platform for users to create and deploy Web applications on Microsoft, Netscape and Oracle servers. WebServer 2.1 for Sun Solaris is available for download now via Oracle's Web site (www.oracle.com), with an NT version due out by year-end. Pricing has not been announced.

As previously reported, Oracle released a Java-based commerce server for secure payment over the Internet. The Payment Server will work with Oracle's Apollo merchant server to enable users to set up virtual storefronts on the Web and to accept credit card payments within a secure environment, the company said.

Oracle also announced that it will Web-enable all 30 modules in its client/server applications suite, giving users access to applications via any Java-enabled browser. The Web-enabled applications are expected to be available in the second quarter of 1997.

©Oracle: (415) 506-7000.

Mills is a correspondent in IDG News Service's San Francisco bureau.

BAA

Continued from page 45

We have a large amount of applications and data that we need to migrate to client/server over time," he said. Applications run on a mixture of IBM mainframes, Digital Equipment Corp. minicomputers and some Unix machines.

BAA is also going through a business reengineering exercise aimed at improving the way it builds aircraft wings for the European Airbus Industrie consortium. In doing so, it needs to build flexible information systems that can mirror changing business processes, Schechter said. "We agreed with the businesses that we needed to unite the IT function with the changes going on in the company using the Common Object Model," he said.

The company considered object-based solutions from Digital, Sun Microsystems, Inc. and Hewlett-Packard Co., but finally chose the DAIS object request broker from International Computers, Ltd (ICL).

For Schechter, the object approach offers significant advantages over just installing vendors' packages.

"We believe packages have a lot of merit, and we are moving towards the use of packages — such as our new computer-aided design and engineering data management. But to us, the ability to integrate those packages is the key," Schechter said. "While packages offer flexibility early on, we see them as a kind of electronic cement: Once you've implemented them and your business processes change, you are faced with the task of breaking them apart."

His alternative is to generate a business model that will define what he calls a thick infrastructure of system components and services that will be distributed on the ORB.

"We attempt to achieve the flexibility by trying to place a thin application layer on top of that, which reflects the organization and the process changes. As processes change, we can basically add applications that will plug and play into this thick infrastructure, and be distributed through the ORB," Schechter said.

The architecture, he said, will allow the company to choose best-of-breed applications when they are needed and remove them when business processes change.

The whole project is being managed by Computer Sciences Corp., which took over the operation of BAA's information systems in an outsourcing deal arranged two years ago.

WHAT IS CORBA?

The Object Management Group's **Common Object Request Broker Architecture (CORBA)** is designed to let applications communicate with one another regardless of location.

Version 1.1 defines interfaces between client/server applications and ORBs, which are middleware for linking objects across a network.

CORBA 2.0 defines interoperability among different vendors' ORBs.

The pilot project will involve the installation of i500, ICL's X.500-compliant directory server, to support 380 users. This should be completed by the end of January.

Condon is a correspondent in IDG New Service's London bureau.

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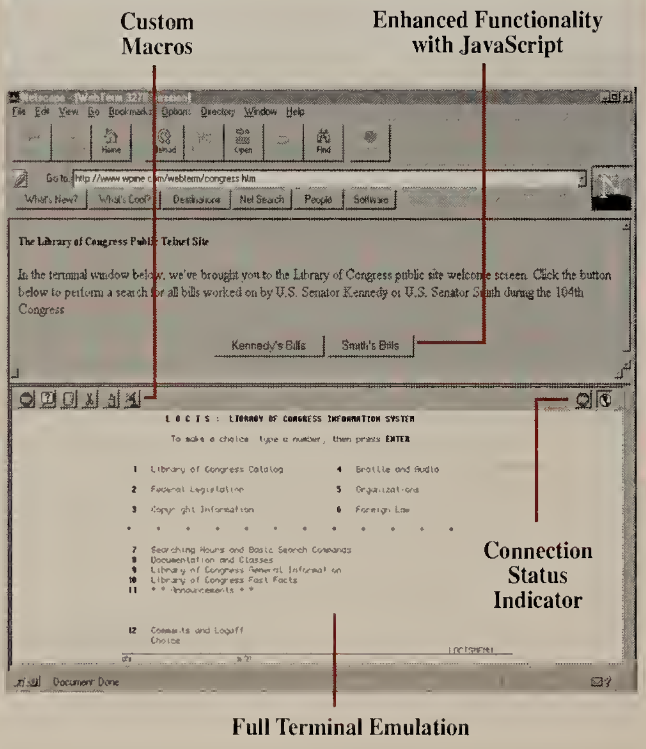
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- *Must be installable using Systems Management Server*
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SHARED LOGIC

No silver bullet for the Internet

Internet computing has been handed the troublesome mantle of cure-all, direct from its former owner, client/server computing.

As client/server computing did three years ago, Internet computing is enjoying its day in the sun before it becomes apparent that there is no such thing as a panacea. In the case of client/server, the real limiting factor had nothing to do with the network, protocols or applications. It had to do with the database.

The basic flaw in client/server is that corporate data is distributed and not centralized. No matter how many schemes the vendors devise for putting the data back together again, distributed databases are just too difficult for large-scale deployment.

With the Internet, many people are predicting that the limiting factor will be physical bandwidth. But bandwidth is a hard commodity that can usually be increased.

Will the limiting factor be the database again? I don't think so. If anything, Internet computing gives us the opportunity to recentralize the database. And the rapid release of several robust server-side database interface products confirms that the Web will soon be ready for serious day-to-day corporate use.

For example, today I can buy Oracle Corp.'s WebServer 2.1 and quickly integrate it into my Web site. In addition to being a standard HTTP server, WebServer comes with a Java interpreter for Oracle's server-side Java classes.

For a more generic approach, I can turn to LiveWire, Netscape Communications Corp.'s server-side development environment.

It uses a generic database object to access all major databases using native drivers to connect and execute SQL. Data is then formatted into HTML for delivery to the client's browser. Competitive to LiveWire is Microsoft Corp.'s DBWeb, which is a gateway directly built into Microsoft's Internet Information Server. Like LiveWire, the database requests are embedded in HTML pages and executed when the user requests the HTML form.

Marc Myers

Or I could choose a home-brew solution, which is actually not such a bad idea. Sun Microsystems, Inc. has just introduced the Java Remote Method Invocation (RMI) system, which is similar to remote procedure calls (RPC).

What makes RMI especially cool is that unlike RPC — which is limited to procedure calls — it allows me to invoke remote objects. So if I write a server-side Java object that queries an Oracle database and formats the output into HTML pages I can use RMI to access that object from the browser and take full advantage of the server's processing power. Java RMI is in pre-beta release and can be downloaded from Sun's Web site. It is definitely worth looking at before you jump into a proprietary solution.

Based on the incredibly rapid rate of introduction of robust server-side Internet database access tools and the Web's unprecedented technological adoption there is no silver bullet for the Internet that I can see.

Perhaps we really have found a superior solution, even if it's not a cure-all.

Myers is CEO of Client/Server Connection Ltd., a New York-based software developmen company. He can be reached on the internet a mmyers@cscl.com

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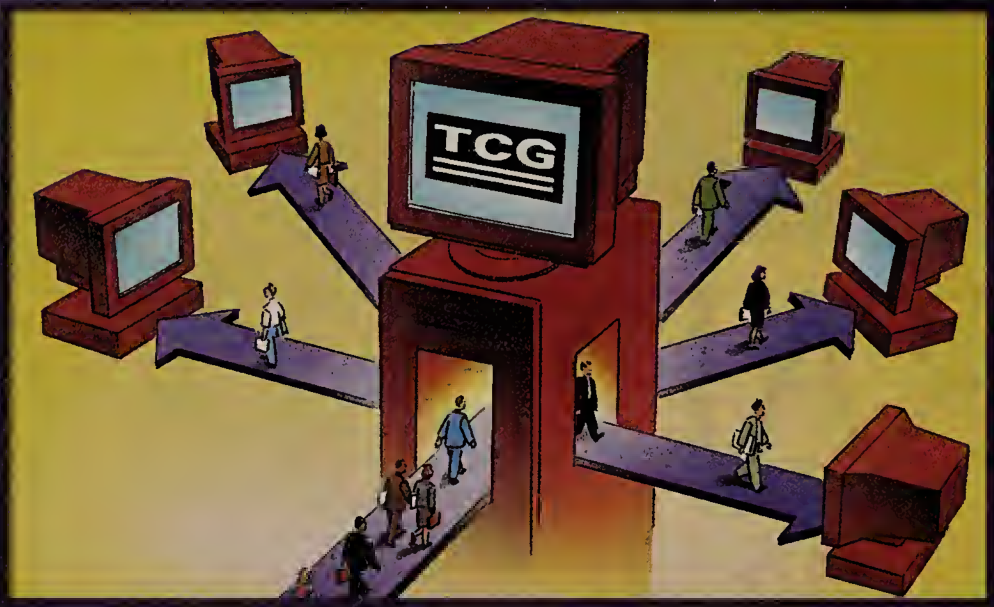

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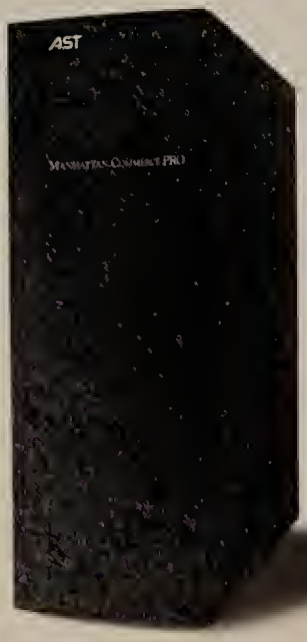

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Circle Reader Service #**41**

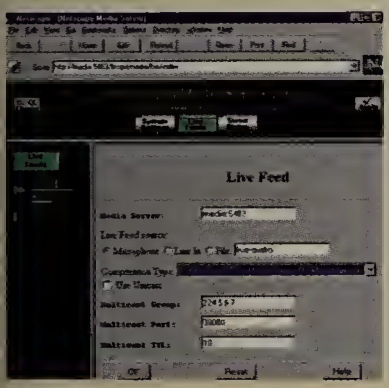
Intranets & the ’Net

Covering: Internet Technologies and Services
for Collaboration and Electronic Commerce

Briefs

■ **Netscape Communications Corp.** *last week released the public beta of its Directory Server for Windows NT. The Windows version helps users synchronize NT and Netscape directories and allows them to employ their NT passwords to log on to any of Netscape's SuiteSpot servers. The final version is due out next month.*

The Mountain View, Calif., software company last month began shipping the commercial version of its Directory Server on a variety of Unix platforms. Netscape's directory server line, featuring support for the Lightweight Directory Access Protocol, lets users locate names, phone numbers, E-mail addresses, security keys and contact information.



Also recently, Netscape made available a public beta of its Media Server 1.0, including streaming audio to enable transmissions over lower bandwidths.

The Media Server also automatically detects the bandwidth of a connecting client, delivering compressed audio optimized for that bandwidth, and can synchronize audio data with HTML pages, Java applets, JavaScript applications and Netscape plug-ins.

Both the Media Server and Directory Server are priced at $995.

Netscape: (415) 937-2555.

■ **Wallop Software, Inc.** *this month will start shipping Built-IT, a $2,495* **tool kit** *for building Web-based applications such as HTML pages, Java applets, ActiveX controls, GIF images and databases forms.*

Wallop: (415) 341-1177.

In-Site

Kodak shoots for a picture-perfect site

Next step involves upgrade to Oracle Web server.

By Ellen Messmer
Rochester, N.Y.

With the World-Wide Web the focus of its electronic commerce efforts, Eastman Kodak Co. is spending millions of dollars to make its site (www.kodak.com) picture-perfect.

For instance, under the rules Kodak has set for itself, every Web image has to fully materialize on-screen within 10 seconds, even if the visitor's modem speed is 14.4K bit/sec. If someone sends an E-mail asking questions about photography or film products, Kodak tries to answer in one day. The company gets the answers with the help of an automated message sorter that speeds the inquiry over the corporate intranet to the appropriate Kodak division.

Kodak has strict style guidelines for its Web pages. Each page is kept under 60K bytes to facilitate speed in viewing.

“We try for 24-hour turnaround, but we don't always make it, particularly with hard questions about finding old film in an attic that's gotten wet,” acknowledged Suzanne Welch, Kodak's general manager of Internet Marketing who monitors the daily flow.

That is better than it used to be. “When we started out on the Web in early ’95, the [sorting] process was very manual and took longer,” she said.

Kodak's big adventure

Kodak's Web adventure is the joint effort of its 10 separate business divisions, coordinated by the Kodak Internet Marketing division, now in charge of more than 6,000 dynamically changing Web pages.

The Internet Marketing team's technical expertise is supplied by Terence Lund, director of Internet utilization; Richard Myles, senior Web software engineer; Ronald Jamerson, manager of Web site architecture; and Wayne Neale, Web site manager.

Seventeen graphic artists, including Daniela Jorge and Cindy McCombe who happen to have the rather new-millennium job title “visual interaction designer,” extensively test every page they create. This is because a page can look and act differently based on the user's brand of browser and computer platforms.

Every Web page generated at Kodak contains metadata about the page's review date and expiration date, Jamerson said.

Both McCombe and Jorge said the crazy pace of browser rollouts from Netscape Communications Corp. and Microsoft Corp. has made the Kodak page-testing process more frenetic.

Macromedia, Inc.'s Shockwave is one of the Web graphics tool kits Kodak uses because a lot of people have Shockwave plug-ins, Jorge said.

Download our guide to building an industrial-strength Web site and link to the Kodak Web site.

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McCombe, who holds a graduate degree in computer graphics design and human-computer interaction, said Kodak has set strict style guidelines for Web pages, keeping them under 60K bytes to facilitate speed in viewing.

Kodak is counting on the Web to augment the more traditional routes for customer contact, such as toll-free call centers, printed brochures and other advertising, said Michael Pagano, manager of Internet communications.

Kodak has put its 125 digital

See **Kodak**, *page 62*

New tools

Innotech readies Java-based intranet search engine

NetResults client allows users with Java-enabled Web browsers to perform searches.

By Ellen Messmer
Toronto

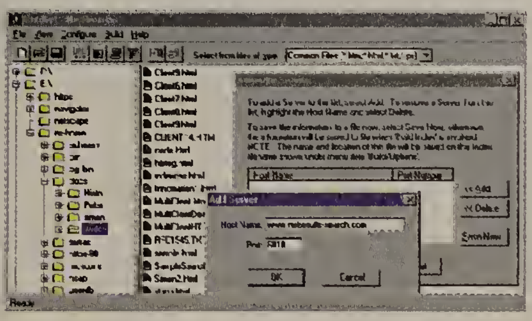
Innotech Multimedia Corp. this week will unveil a Java-based search engine for locating indexed files across corporate intranets.

When a user with a Java-enabled Web browser wants to perform a document search, the Web server-based NetResults search engine downloads a Java search applet that acts as the client software for performing complex, interactive queries.

“With this NetResults client, you can formulate your query to find a document or a class of documents,” said Simon Arnison, Innotech's vice president of research and development. Because the search engine is Java-based, it can reside on any computer running the Java Virtual Machine.

Administrator's tool

The $1,995 package comes with the Administrator's Tool, which can be used to create an index of information located on any Web site.



Host Name: www.netresults-search.com

Innotech's *Java-based search engine lets you do cascading searches.*

The tool, however, is not written in Java, and requires an IBM-compatible 486-based machine running Windows 95 or NT, plus 16M bytes of RAM and a CD-ROM drive.

Innotech plans to release a Java-based version of the Administrator's Tool in the future.

North American Media Engines, Inc., which has been beta-testing NetResults, has found that the product supports more complex queries than do typical Web search engines. “And because it's written in Java, we can move it from one Web server to another easily,” said Matthew Rubenstein, chief operating officer of the software developer, based here.

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Maintaining your network is easier now, too. Thanks to some cool new features on Compaq Insight Manager, you can get updates and new software revisions via the Internet, your modem or CD. And then transfer them to the Integration Server just one time. You can even maintain your network when you're away from the office. All you need is your notebook and a phone line.

We've also partnered with the industry-leading companies of system management applications. So now you can view your entire network in one place. Together, these and other improvements have helped reshape the landscape of mid-range computing, by creating the most manageable server in the industry. To find out more about the ProLiant 5000, visit our Web site at www.compaq.com, or call us at 1-800-315-7772. It's not just a server. It's a force to be reckoned with.

intel inside
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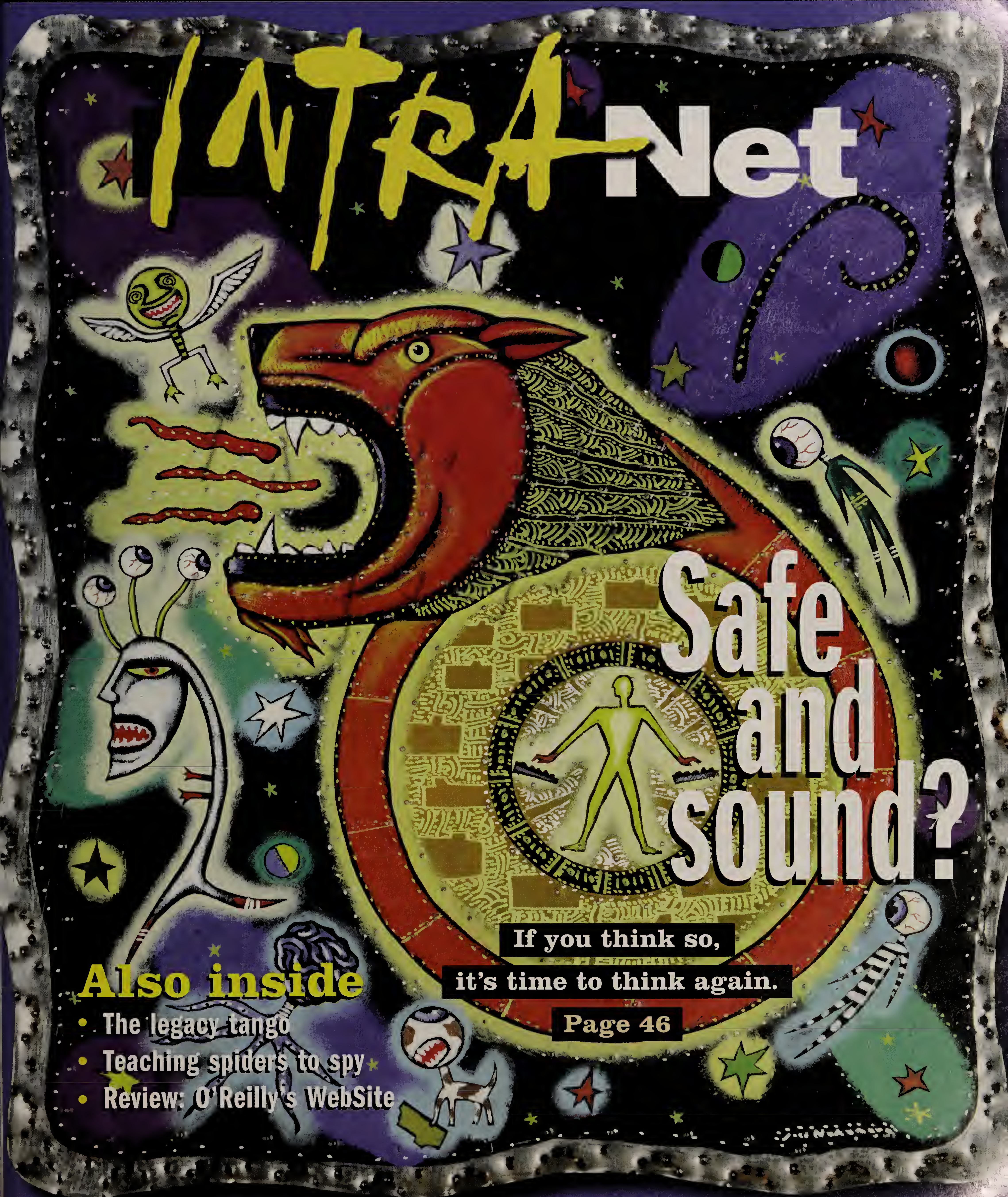
INTRANet



Safe and sound?

If you think so,
it's time to think again.

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- The legacy tango
- Teaching spiders to spy
- Review: O'Reilly's WebSite

Capitalizing on Internet Technologies

Microsoft Windows NT Server 4.0

lets you build

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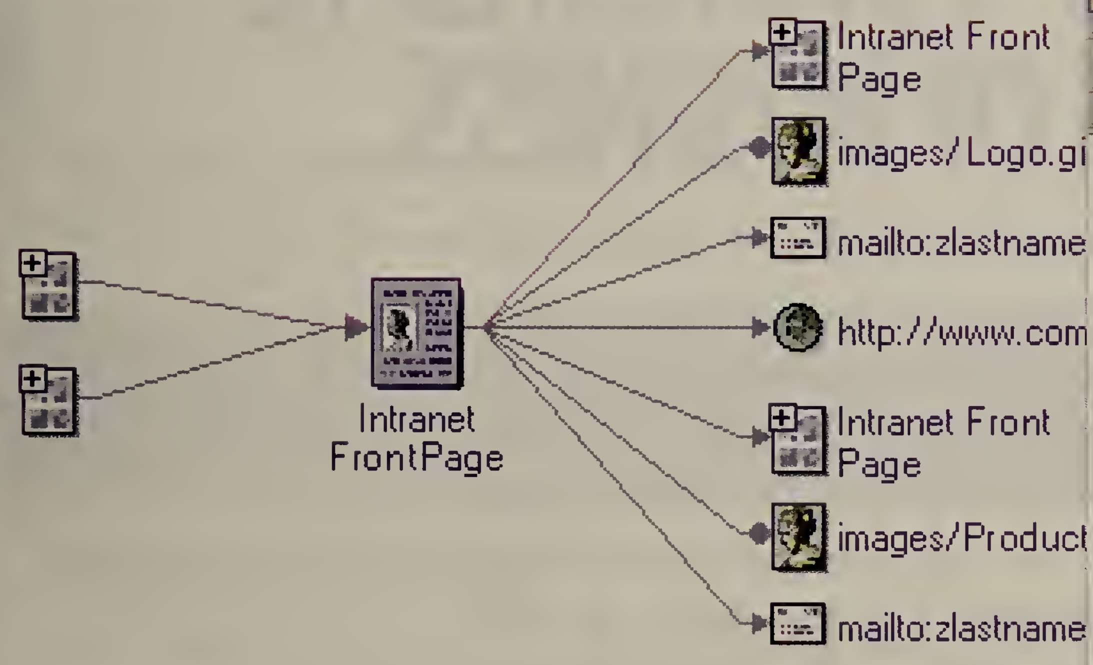

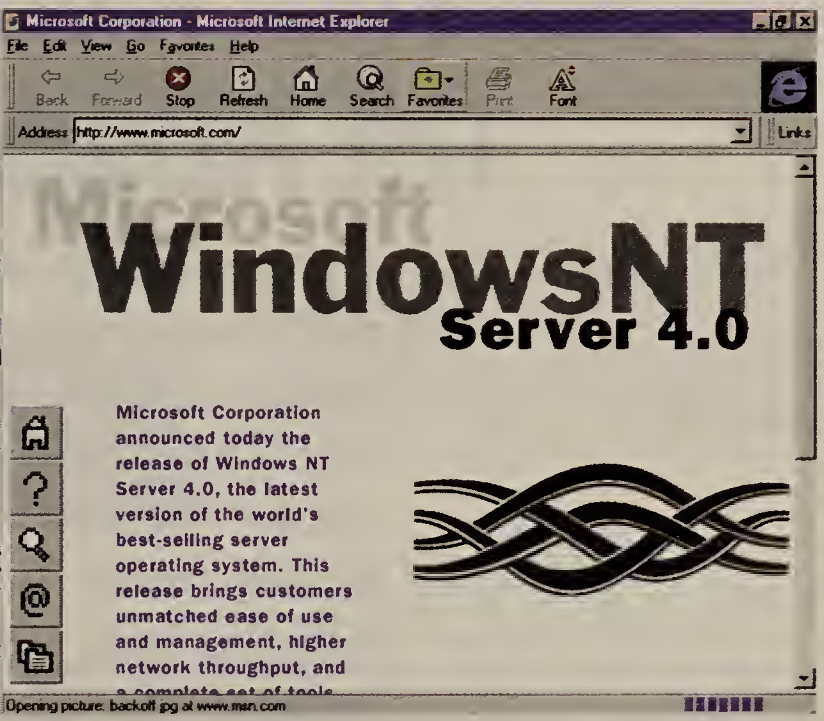
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Microsoft Corporation announced today the release of Windows NT Server 4.0, the latest version of the world's best-selling server operating system. This release brings customers unmatched ease of use and management, higher network throughput, and a complete set of tools

New Windows NT® Server 4.0 extends beyond file, print, application and communication services to offer a complete and integrated Internet and intranet platform. You can easily expand your existing network to include the Internet and intranet because Windows NT Server 4.0 comes with Microsoft Internet Information Server and Microsoft FrontPage web authoring tool included—and Microsoft Index Server is free off the Web.* Innovations like PPTP, MultiLink Remote Access and DNS make it even easier by offering you secure, flexible, high-bandwidth communication across the Internet. And, of course, Windows NT Server supports all standard Internet protocols so you're never locked in or left out in the Internet cold. Windows NT Server 4.0 performance is better too: It offers over twice the network throughput and is 35% more scalable than Windows NT Server 3.51. Most importantly, Windows NT Server is easy to use. With features like the Windows® 95 interface and wizards that automate common administrative tasks, you can move on to more important things, like lunch. If eating somewhere other than at your desk sounds like something you'd be interested in, take a closer look at Windows NT Server 4.0 at our Web site.

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Circle Reader Service #8

I N S I D E

IntraNet

October 1996
Volume 1, Number 5

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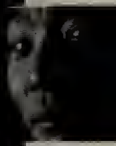

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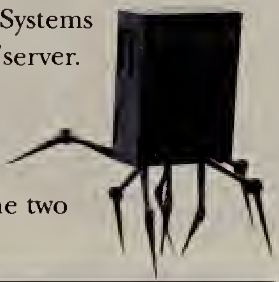

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From the Editor

Client/server is dead. Long live client/server (in Web dressing)!

That was the resounding chorus at the recent Internet Commerce Expo (ICE) in Anaheim and at Interop DotCom in Atlanta. If you're deploying client/server applications today, stop. Retool them with browser front ends.

Client/server was killed by complexity, said Dean Marino, a research associate in Dow Chemical Co.'s computing and information technology laboratory. Every back-end application requires a different client and often a middleware component. The architecture is costly, bloated and difficult to manage.

Compare that to the simplicity of using browsers to access back-end applications. As Netscape CEO Jim Barksdale pointed out at ICE, with client/server, we overlooked the need for the client to act like a phone. "You want to be able to use one instrument to call your doctor, your broker, your dentist."

Problems remain with the universal client vision. For example, the stateless nature of the Web (every link invokes a new connection) wreaks havoc with things like security and data concurrency. But there are a few early workarounds, and developers are hard at work on these issues.

In fact, that's the point. The allure of intranets is so great that companies are committing lots of development money to the cause. Dow, for example, is already using its Web servers to support mathematical modeling.

It's only going to get better with time.

John Dix, Editor (jdix@nww.com)

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hot links

insight, humor and other marginalia from planet intranet.

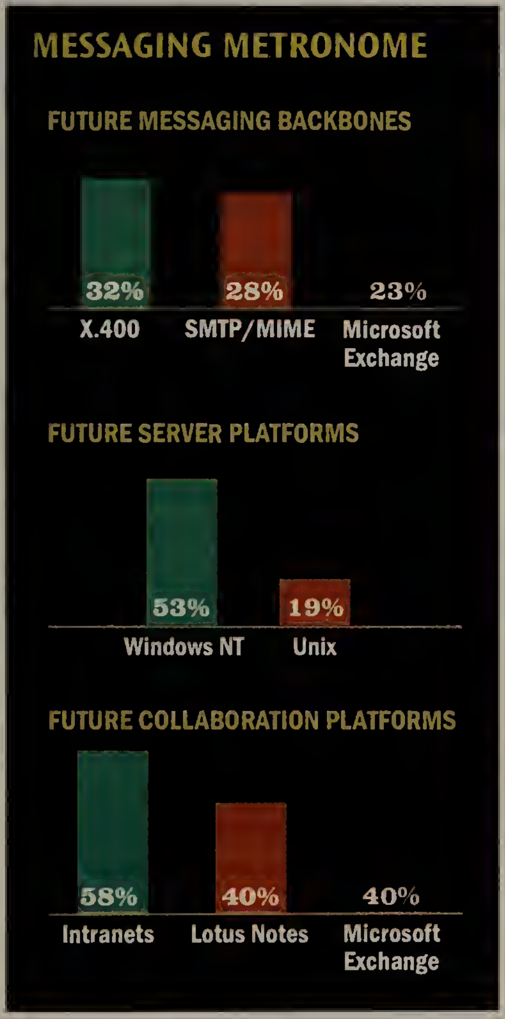
Animation agreement

Web sites are getting noisy and animated thanks to some recent vendor agreements on multimedia delivery standards.

Cisco Systems, Inc. (cisco.com), Intel Corp. (intel.com) and MCI Communications Corp. (mci.com) recently agreed on IP Multicast, Resource Reservation Protocol (RSVP) and real-time transport protocol (RTP) for bandwidth issues, and launched some joint trials. This cooperation could boost development of real-time audio and video streams.

"This is the multimedia-enabling technology corporate users have been waiting for," says Kathy Klotz, an analyst with Dataquest, Inc.. She calls RSVP "an important move toward enabling better quality video communications" because it dedicates certain bandwidth to audio and video transmissions. RTP and IP Multicast also help allocate the pipe. Klotz expects first products as soon as next month.

Also on the multimedia front, Apple Computer, Inc. (apple.com) announced it will implement its popular QuickTime application program interface feature set on Microsoft Corp. Windows 95 and Windows NT, with some help from Data Translation Corp., Macromedia, Inc. and Truevision, Inc.



Intranet messaging

Intranet/internet-based messaging systems are rapidly driving out LAN-based E-mail, according to a survey of Fortune 1,000 firms by The Radicati Group, Inc., in Palo Alto, Calif.

Organizations are switching to standard messaging systems, notably Multi-purpose Internet Mail Extension, Simple Mail Transfer Protocol and X.400. Twenty-one percent say they're already deploying backbones that combine MIME, SMTP and X.400.

NT is edging out Unix as a future server platform, but mixed-vendor environments appear to be the norm for intranets. Companies say their workgroup environments will include a combination of internal Web technology, Notes and Exchange.

Respondents were allowed multiple answers.

NAME	COMPANY	AWARD CATEGORY	PRODUCT/SERVICE
(Front left to right)			
David Averett	NetFRAME	Web Server Hardware	NetFRAME Server
Dennis Cagan	Software.com	Intranet Infrastructure	Post.Office
Gil Schwed	CheckPoint Software	Security Products	FireWall-1
Steve Zocchi	NetDynamics	Authoring & Development	NetDynamics
J. P. Stanley	FTP Software	Collaboration Tools	GroupWorks
John Guerster	Open Market	Electronic Commerce Tools	OM-Transact
(Back left to right)			
Rick Fleischman	Netscape	Web Server Software	Navigator
Vishal Nanda	Netscape	Web browser	Enterprise Server
Allan Taffel	UUNET	Internet Access Provider	UUNET Internet Access
Bob Kutnick	Quarterdeck	Search & Retrieval Tech.	WebCompass

Winning lineup

We're pleased to announce the winners of the first annual IntraNet Excellence Awards, which honored 10 companies for product innovation and leadership. The winners, picked by a panel of judges, were presented awards at NetWorld+Interop conference in Atlanta.

The judging panel included James Breyer, managing partner of Accel Partners; Jeffrey Held, a partner with Ernst & Young's Technology Services practice; Neil Weintraut, advisory director of the Internet at Hambrecht & Quist; Richard Villars, director of network software research at International Data Corp.; Mimi Brooks, president and CEO of Logical Design Solutions; Edwin Mier, president of Mier Communciations; Michael Goulde, vice president and senior consultant, Patricia Seybold Group; Kevin Tolly, president of The Tolly Group; and Patricia O'Hern, senior consultant with Utopia.

Can't get no respect?

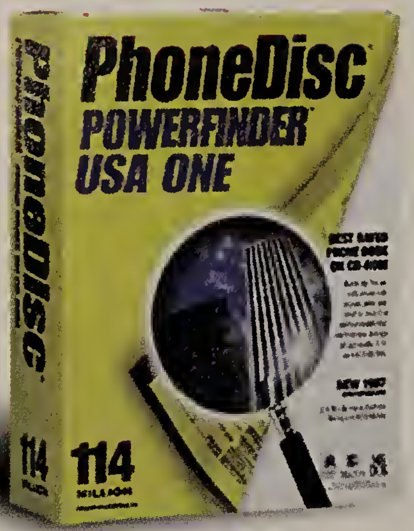
Having trouble getting content owners to keep documents up to date? Try this trick:

Create a Java applet that watches a date counter. When users access a document that is more than 120 days old, the applet opens a window with a message that says, "Danger: This data may be out of date. Contact Imin Trouble at itrouble@lazy.com."

"It doesn't take long for content owners to realize that keeping the Web documents up to date is less laborious than answering all that E-mail," says the intranet evangelist who cooked up the idea.

hot links

Find that contact



Tired of wasting time dialing 555-1212 in search of phone numbers? Put up a national directory of business and residential listings on your intranet and open it to browser users.

Digital Directory Assistance, Inc.'s PowerFinder USA One database of 115 million listings, used with the company's PhoneDisc Intranet Server for Windows 95 or Windows NT, makes it possible to search for listings by name, type of business, address or phone number. The database takes up six slots on an optical disk jukebox or 4G bytes of hard disk space.

Longitude and latitude coordinates are provided on request, and distance searches can be run, providing, for example, all the pizza shops within three miles.

The USA One database costs $259 and the server software costs $99. Additional charges apply, based on the number of users supported. Contact DDA at www.dda-inc.com.

E-mail vs. intranets: a cost comparison

Finding hard and fast numbers to help justify an intranet project can be a challenge, but one Silicon Valley firm found this way to rationalize a project.

The company was distributing a 750K-byte master supplier list as an E-mail attachment to all company employees around the world once per quarter. An intranet convert went to MIS and asked it to calculate the cost of sending that attachment. MIS came back with the following estimates:

- Transmission cost through the company WAN to almost 200 locations worldwide: $500
- Storage of the document on mail servers in all locations for a period ranging from 1 minute (immediately read) to one month (employee on the road), assuming 10% of the employees actually needed the listing and saved it to local disk: $3,250
- Total cost: $3,750 per each 750K-byte E-mail.

A Web solution was proposed to the content owner as an alternative, and has since been adopted. Here are the cost estimates:

- Transmission cost of a 2K-byte E-mail note to all employees that says, "If you're interested in the latest copy of the master supplier list, go to this URL: <$10
- Since people who are not interested in the list immediately delete the message, and since there is nothing to save, storage costs have been reduced to less than $35. (This figure takes into account the cost of caching the data at eight proxy servers used as local distribution points to reduce transmission costs.)
- Total cost: <$45

The savings per quarter added up to roughly $3,700, or $14,800 per year. A further benefit: The content is never out of date. With thousands of suppliers, the list changed daily but was only being updated every 12 to 13 weeks.

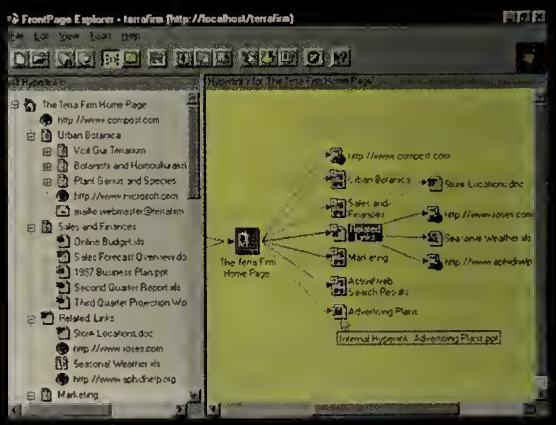
Microsoft animates HTML editor

Microsoft Corp. FrontPage 97 Web design tool can be downloaded from Microsoft's Web site (microsoft.com) this month, but you need to shell out $10 for the CD-ROM version if you want all the extras crammed into this release.

Noteworthy is the Image Composer, a high-end image editing program bundled in the FrontPage 97 Bonus Pack of templates, art and assorted accessories. Its chief innovation is the use of "sprites," or images defined precisely by their shapes. Users can move, resize and manipulate images directly, without retaining a cutout border around them.

FrontPage 97 offers a peek at the upcoming Office 97; FrontPage shares code with that family, says George Meng, group product manager for FrontPage. Users can build hyperlinks among documents created under any Office application, including Access, Excel, PowerPoint and especially Word. FrontPage 97 integrates tightly with the word processor; it accepts the 25 most common shortcuts found in Word and uses Word's dictionary.

FrontPage 97, which only runs on Windows 95, also implements ActiveX controls and handles Java applets and new HTML tags (like marquees) and other multimedia features. The update also supports Netscape plug-ins.

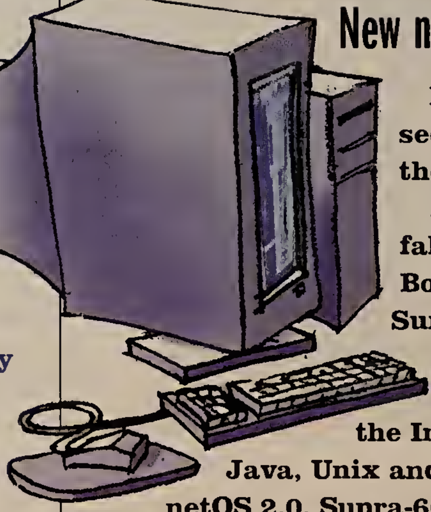


FrontPage 97 integrates the Explorer browser so developers can pair it with other features like this Web site map.

The company even throws in copies of Internet Explorer 3.0 and Microsoft Personal Web Server, which is the same product bundled with Windows NT workstation.

Microsoft expects to ship FrontPage 97 by year-end; the current version is priced at $149 as is.

New network computers swallow software



Network computers (NC) are entering their second generation, even as pundits debate their worth.

A couple of these thin clients will ship this fall. HDS Network Systems, Inc. (hds.com) and Boundless Technologies, Inc. (formerly SunRiver Data Systems) offer entry NCs for less than $700 with some basic software. The new HDS WorkStation Supra-66 is based on the Intel Corp. 66-MHz RISC processor. It runs Java, Unix and Windows, plus the HDS operating system, netOS 2.0. Supra-66 models start at $1,299 for a system with 8M bytes of RAM, but the sibling 40-MHz Supra-40 line starts at $699.

The new entries from Boundless Technologies (boundless.com) make up the Boundless NC line, ranging from 25-MHz to 33-MHz Intel i960 systems. All include Windows, a local Java browser and 3270 terminal access software. Options include audio and telephony functions. Pricing for the Boundless line starts at $649.

The companies tout lower cost of ownership and easy hookup to IP networks to lure corporate interest.

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LDAP: Making corporate directory lookups quick and easy

BY MARK GIBBS

Have you ever had a conversation with a Web newbie trying to find the name of a particular department's intranet server? Then you know what a headache can result. Of course, if you don't need to be diplomatic, you can simply say, "That's the way it is buddy, now get out of my hair." The more polite might end up explaining the intricacies of Internet-style naming and the limitations of directory services.

The problem of naming things on networks has been with us for a long time, and the most common solution has been the Internet's Domain Name Service (DNS). Over the years, DNS has served the Internet community well, but commercial implementations require a more flexible and richly featured directory service.

The solution to the above support problem and the successor to DNS may well be the Lightweight Directory Access Protocol (LDAP), which derives from an ISO X.500 standard called Directory Access Protocol and is now managed by the Internet Engineering Task Force.

There's gold in this protocol. LDAP's powerful architecture has attracted the likes of IBM, Microsoft Corp., Netscape Communications Corp., Novell, Inc. and dozens of other industry players. More than 40 vendors have publicly committed to supporting LDAP, and if its implementation and adoption proceeds as it appears it might, a whole new directory system for the Internet and intranets may soon appear.

LDAP's powerful architecture has attracted the likes of IBM, Microsoft, Netscape, Novell and dozens of other industry companies.

The end result, which will materialize perhaps as early as the first half of 1997, should be a directory service that is effective and as simple to use as A, B, C.

Communications access protocol

A directory generally provides the ability to retrieve the values of one or more attributes of an entity defined in the directory. With DNS, for example, the request to resolve the entry www.gibbs.com would return 199.201.128.15. This name-to-numeric address translation is arguably one of the most important underpinnings of the Internet. However, DNS doesn't provide much additional functionality. To keep up with the Internet and intranets, much richer directory services are needed.

To make your intranet user-friendly, for example, you need white pages so users can easily look up E-mail addresses. A user should be able to run a search for "Mark Gibbs" and find out his E-mail address is mgibbs@gibbs.com. You also need certificate servers so people can find public encryption keys; yellow pages so they can locate other people, organizations and resources by type or function; and a whole raft of other services that will provide an infrastructure that really supports commercial use.

All this access to directory services requires a communications protocol. Enter LDAP, an access protocol that operates over TCP/IP and provides access to either proprietary stand-alone directories or X.500-compliant systems. LDAP is defined in the IETF's RFC 1777.

Hierarchical approach

The directory model underlying LDAP is based on client/server access to entries, or records in the directory database. An entry contains a relative distinguished name (RDN) and a collection of attributes.

The inverted-tree directory model underlying LDAP is based on client/server access to entries, or records in a directory database.

Entries in an LDAP directory are arranged into an inverted hierarchical tree, much the same as for X.500. With LDAP, the hierarchy rules of X.500 and the available attributes types are not required, though for compatibility's sake, it is probable that most directories will use X.500 conventions.

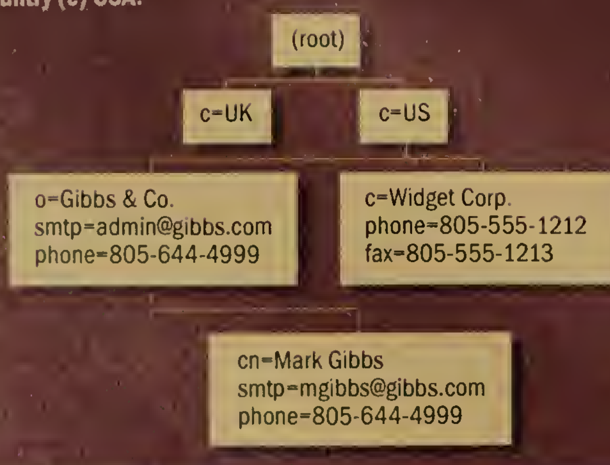
An entry's distinguished name (DN) is the concatenation of all of the RDNs of each entry that leads from the entity to the root of the hierarchy. The hierarchical tree pictured at left shows that the entry for "Mark Gibbs" with the RDN of "cn=Mark Gibbs" has a DN of "cn=Mark Gibbs, o=Gibbs & Co. and c=US." The attributes of each entry are typed: cn, o and c, which stand for common name, organization and country, respectively. In the example, each has an assigned value.

With X.500, complete DNs are required to define an entry. As a

See Handbook, page 12

DISTINGUISHED APPROACH

LDAP directory entries are arranged into an inverted hierarchical tree. This tree shows that the entrant's common name (cn) is Mark Gibbs, from the organization (o) Gibbs & Co., which is located in the country (c) USA.



ASK DR. INTRANET

David Morro is in for consultations. He'll help diagnose your intranet ailments or recommend corrective steps. Send your questions to dr.intranet@nww.com.

Is it possible to create personalized Web pages?

Allowing your CEO to customize his start-up page to include the company's stock price rather than the inventory of pencils can help keep the intranet user-friendly. Rather than get lost in a sea or worthless information, users can configure their start-up pages to include links to only frequently accessed pages and functions.

The most common implementation of personalized start pages uses an HTTP technology called cookies. Cookies refer to name/value pairs a Web browser uses to store user information, including start-page preferences. Netscape Communications Corp., for one, is trying to make it easy to create these pages (see http://home.netscape.com/newsref/std/cookie_spec.html).

As part of its recently introduced AppFoundry program, Netscape has developed a template for adding customizable start pages to your intranet. This application uses JavaScript to issue the appropriate cookie to the client, but the functionality can be added through custom Common Gateway Interface scripts, as well.

It seems a number of vendors are offering intranet product suites. Do you think it's wise to buy into such a suite or is it better to mix and match vendors' products?

Software companies combine their software products into packages, or suites, for two reasons: one, to provide a complete and integrated solution, and two, to sell more software. To make sure you're not getting soaked with software you don't need, approach your product evaluations with a clear definition of your intranet's role and an understanding of each vendor's strategic aims.

Netscape, for instance, offers a collection of servers in a suite called SuiteSpot. And through its recently introduced AppFoundry program, Netscape intends to continuously develop intranet applications that extend the use of those servers.

Microsoft, on the other hand, has integrated its Web server into Windows NT and will partner the server with a new generation of Web-enabled desktop applications that will let users interact with the corporate intranet using already-familiar tools.

By all means, if the suite fits, buy it. Standardizing on a single company's products will greatly simplify installation, integration, training and maintenance of your intranet.

Morro is a Web architect at Interse Corp., a Sunnyvale, Calif.-based Web development firm.

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Handbook, *continued from page 10*

result, many X.400 E-mail users have long, complex DNs on their business cards. LDAP, by completely hiding DNs, makes the service far more accessible to the average user. Instead of needing to know a long, complex DN, LDAP makes it possible to simply look up someone by the name and company listed on his or her business card.

The heart of LDAP are the operations defined for searching and modifying the directory. In fact, searching is estimated to exceed other LDAP operations by at least an order of magnitude in real-world systems.

LDAP can be configured as a distributed directory system so that two or more LDAP servers can manage separate parts of a directory tree. The servers don't have to keep complete trees, so if an LDAP client makes a request that a server can't resolve, that server can refer the client to another server.

To maintain integrity, LDAP provides a way for a client to prove its identity to a directory server. Kerberos, an authentication system that lets two communicating computers prove their identity to each other while preventing eavesdropping or other attacks, is most commonly used.

Access Control Lists control which classes of clients can access which classes of information at which level — none, compare, search, read, write, delete. LDAP directory servers can log all additions and modifications to provide an audit trail of changes.

Vendor positioning

The use of LDAP systems in intranets and on the Internet will not displace DNS, but rather work in conjunction with it. Netscape, in a positioning paper called "An Internet Approach to Directories" discusses some scenarios of how this might work. Particularly interesting is a proposed URL definition to support LDAP searches.

The degree of LDAP support is an encouraging sign that effective directory service may be somewhat nearer to reality than one might think. Certainly a race to be first with a practical system seems to be brewing.

LDAP ON THE WEB

Get more information on LDAP on Network World Fusion. Key the number at right into the DocFinder box on the home page.

FIND IT ON FUSION 2101

http://www.nwfusion.com

Netscape, in the paper mentioned above, has the best-articulated position. Microsoft, despite its pledge of support, really seems more interested in pushing the market toward its Open Directory Services Interface (ODSI) as an interoperability layer to interface with all directory services.

In response to the market in general and to Microsoft's ODSI positioning in particular, Novell proposes that its Novell Directory Services becomes X.500-compliant and forms a superset API to everything, including ODSI.

Until these vendors solidify their plans, it is difficult to say who will determine the market direction. Watch for the major battle to be between Microsoft and Netscape.

What does LDAP and its nascent market imply for intranets? The answer is simple: Because naming won't be constrained by the artificial constructs used in systems such as the dominant DNS, users will be able to look for and find resources much more easily. And, once LDAP is integrated with network management tools, you'll be able to better organize the resources on your intranet.

Unless the LDAP supporters start arguing and delay development and deployment, LDAP is going to become a major service in the Internet and intranet markets. ⊜

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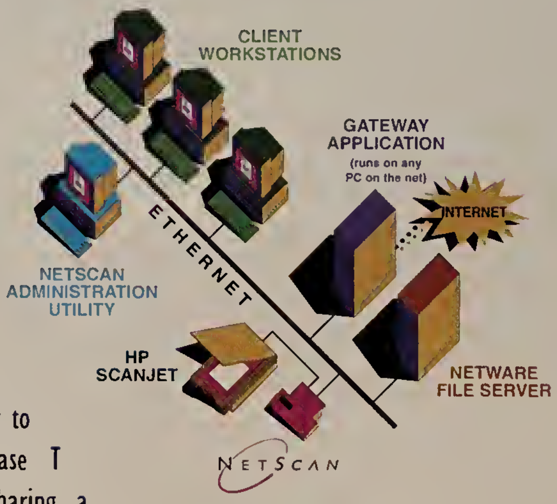

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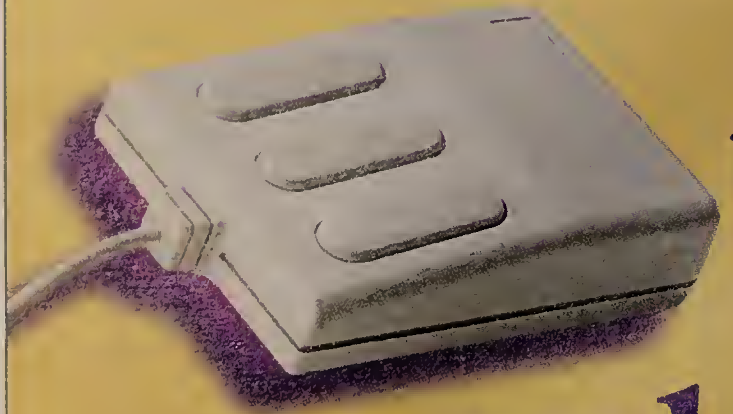
[1] *InfoWorld* (7/8/96).

Circle Reader Service #1



O'Reilly's WebSite Pro 1.1:

Building a better mousetrap

BY MARK GIBBS

The Web server marketplace has exploded over the last year. We've gone from having only a half a dozen freeware systems to more than 100 freeware and commercial products to choose among. And each one, of course, bills itself as the better mousetrap.

So it's now rather difficult to chose a Web server. The actual engine, meaning the HTTP server, isn't tremendously complex or different product to product. What differentiates one Web server from another is the stuff that vendors add: the management tools, diagnostic capabilities and documentation, which is a crucial but often lacking element.

In the computer marketplace, it's unusual to find good documentation, even in top-end products. It's extremely rare to find excellent documentation and a sophisticated product. O'Reilly & Associates, Inc.'s WebSite Professional stands out on both counts.

O'Reilly, a Sebastopol, Calif., publisher known for its high-quality technical books, entered the Web server market about a year ago with WebSite, a Windows NT- and Windows 95-based HTTP server.

While an excellent server with good documentation, WebSite's market potential diminished when Microsoft Corp. entered the Internet product arena last December. O'Reilly realized that in the face of Microsoft's free Internet Information Server, WebSite wasn't going to provide the revenue stream it had hoped. In response, it made WebSite available through what is effectively a free commercial release.

PRODUCT CAPSULE

- **Name:** WebSite Professional
- **Current release:** Version 1.1
- **Price:** $499
- **Vendor:** O'Reilly & Associates, Inc. Sebastopol, Calif.
- **Contact information:**
  Phone: (800) 998-9928
  Web: web.site.ora.com/wspro

But O'Reilly didn't stop there. It upped the ante, so to speak, by launching a much more sophisticated package, WebSite Professional. The move speaks volumes for the company's competitive instincts; taking on Microsoft and Netscape Communications Corp. is not for the faint-hearted.

A professional job

WebSite Pro is a solid performer in terms of throughput, has comprehensive security services and offers not only a tremendous range of utilities and tools but also outstanding documentation. As an intranet (or even Internet) Web solution for mid-scale loads (up to about 300,000 to 500,000 hits per day), the well-designed WebSite Pro is a good value. It boasts one of the best set of management tools and interfaces I've seen.

I tested WebSite Pro running as a service under Windows NT Server Version 4.0 on a 100-MHz Pentium processor with 16M bytes of RAM in a Chatcom, Inc. NT10 server. Generally, you would want to run with 32M bytes of RAM to ensure adequate memory for back-end applications, but WebSite Pro ran on the smaller platform without any problems. (It's interesting to note that many of the Web servers I've tested to date won't even run properly in 16M bytes of RAM.)

WebSite Pro takes no more than half an hour to install from CD-ROM under Windows NT or Win95. Under Windows NT, the Web server can be configured as either a service or an application. Basic configuration parameters, such as server name and directory locations, are done at installation.

The server comes with Getting Started, WebSite Pro Basics and WebSite Pro Advanced Topics manuals.

This has got to be some of the best documentation I've ever seen. It's well-written, clear and extensive. In particular, the manuals effectively walk you through complex topics such as Web server access controls, obtaining and installing server authentication certificates and writing back-end scripts.

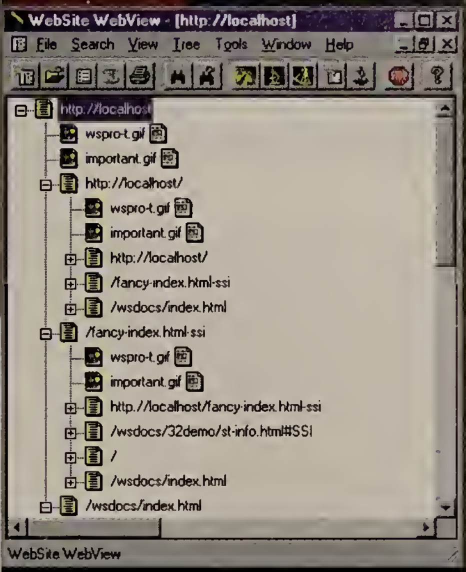
Many Web servers are deficient in their management interfaces, but not WebSite Pro. WebSite actually has two such interfaces: one for the management of the server proper and the other, called WebView, for managing the server's data.

Server management is accomplished through a Windows-style tabbed properties box that can be accessed from the start-up bar. Management functions are grouped into logical sections with excellent context-sensitive help.

O'Reilly also has incorporated a number of wizards, more formally known as automated configuration dialogs, into the management system. With the wizards, setting up virtual servers (multiple domain names and TCP/IP addresses) is easy.

Support for virtual servers is particularly useful in intranet environments. The ability to define unique Web server identities for different departments and workgroups makes it easy to move those groups to new servers when bandwidth or security requirements change.

WEBVIEW O'Reilly



The WebView document management system provided with WebSite Pro presents a hierarchical tree of the contents of any HTTP server.

One of WebSite Pro's strengths is the WebView document management system. WebView presents a hierarchical tree of the contents of any HTTP server — although if the server isn't WebSite Pro, you won't be able to do much beyond browse the documents in the tree.

A Web with a view

You can view your Web documents in several ways: by file name, partial or full URL, the link label (from the HREF or ALT attributes in HTML documents), or document title. This makes it easy to understand the relationship among documents.

Icons show each document's type — such as HTML, image and video — and status. The status icons show at a glance which pages are virtual documents created by back-end scripts and which are external references. You also can tell from the status icons if external and internal links are broken.

WebView has a useful Find feature that lets you filter which documents are displayed. Many Web administrators will find it worthwhile to use the filter to show broken links.

You can modify existing documents with any editor. However, if there's a previous association setup with HTML documents, then WebView considers that association the default.

In addition, WebSite Pro supports an HTTP extension (the Put command) that allows documents to be uploaded to the server. This makes

See Review, *page 18*

Independent developer Robert Denny and a team from EIT helped O'Reilly & Associates develop WebSite.

The WebSite Pro server supports three Common Gateway Interfaces and offers server-side support for Java.

PROS AND CONS O'Reilly's WebSite Professional

Pros

- Provides a complete Web solution
- Offers good management tools
- Comes bundled with database access capabilities and an HTML editor and browser
- Has excellent documentation

Cons

- Has weak remote management capabilities
- Does not integrate with existing user Windows databases

SUMMARY: O'Reilly's WebSite Professional is an outstanding Web server that can provide a sound and effective base for an intranet.

RATING

Value for money	4
Intranet usefulness	5
Quality	5
Overall	5

1 is poor and 5 is excellent

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And it makes interacting with employees, customers and suppliers a snap with application templates to register site visitors and even set up threaded discussions.

Yet its benefits don't stop there. Domino is also secure so you have flexibility over who sees what. And who doesn't see what. It automates workflow processes like lead generation, resume tracking and customer service – so you can act on information, not just read it.

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Circle Reader Service #5

WebSite Pro uses Secure Web transaction technology.

Review, *continued from page 15*

WebSite Pro compatible with editors such as Netscape's Navigator Gold.

To complete the editing facilities, WebSite Pro comes bundled with the HotDog HTML editor from Sausage Software and the Mosaic browser from Spyglass, Inc.

WebView also provides wizards for creating a search page for finding documents using the bundled WebFind search engine, a home page, an Under Construction page and a What's New page. These generic page layouts are inserted into your Web with your specific data embedded. You need to edit the pages to fine-tune their content and appearance. This is a weak component of the product, as there are only four wizards and they really don't add much to your Web management.

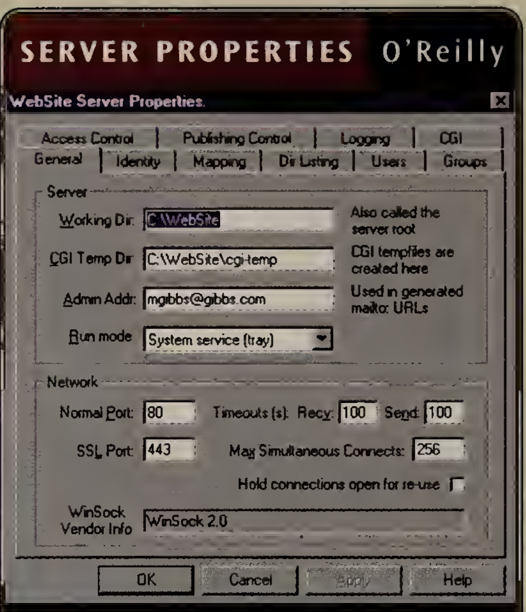
When it comes to security, WebSite Pro is particularly well-featured. It supports the usual Web access controls such as user, group and realm (collections of users and groups), as well as IP address and host name (domain name) filtering.

In addition, WebSite Pro supports Secure Sockets Layer Version 2.0 and Secure-HTTP, both of which allow encrypted communications between servers and clients. Optionally, it supports authentication through digital certificates.

As if all of the above weren't enough, O'Reilly has gone flat out to add features that round out the WebSite Pro server.

The extensive documentation for building back-end applications covers the WebSite API, O'Reilly's equivalent to Microsoft's Internet Server API and Netscape's Netscape Server API. These APIs provide an environment under which applications can run as re-entrant shared Dynamic Link Libraries to improve performance and add value to Web server programming.

WebSite Pro also comes with an imagemap editor for creating images that link to multiple URLs depending on where in the image you click; Allaire Corp.'s Cold Fusion Standard Edition, which lets you link Open Database Connectivity-compliant databases to your Web system; WebIndex, which builds search indexes for your server; and WebFind, which provides the user interface through the WebSite Pro server to the indexes built by WebIndex.



Server
Working Dir: C:\WebSite — Also called the server root
CGI Temp Dir: C:\WebSite\cgi-temp — CGI tempfiles are created here
Admin Addr: mgibbs@gibbs.com — Used in generated mailto: URLs
Run mode: System service (tray)

Network
Normal Port: 80 Timeouts (s): Recv: 100 Send: 100
SSL Port: 443 Max Simultaneous Connects: 256
Hold connections open for re-use ☐
WinSock Vendor Info: WinSock 2.0

WebSite Pro provides a Windows-style tabbed properties box that can be accessed from the start-up bar. Management functions are grouped into logical sections.

Problem areas

WebSite Pro stores all of its configuration settings in the Windows Registry, a process that leads to one of the product's drawbacks: weak remote management. To set this up, you need to configure access to the registry, which can be tedious.

Also on the downside, the WebSite Pro server does not provide integration with the users and groups configured in the Windows system. The lack of integration means that you'll have to re-enter the details of already defined local and network users if you wish to control their access to the Web services.

Setting your sites

Razor blade king Charles Gillette is quoted as saying: "[Ralph Waldo] Emerson said if you build a better mousetrap, the world will beat a path to your door, and that may have been true then… but it's not true now. No one will come. You have to package and promote that mousetrap. Then they will come."

With its WebSite Pro server, O'Reilly has one the best mousetraps, I mean Web servers, in the marketplace, and it is indeed well-packaged and promoted. WebSite Pro is a great product with which to catch your intranet mice. ⊜

Go to website.ora.com/wspro for more information.

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NETWORK ENGINEER
The Microsoft Network
As a member of the **MSN** Operations team, you will be responsible for diagnosing network routing, authentication and name resolution problems for Microsoft Network (MSN) customers; configuring routers and network management systems in a global, multi-protocol network; insuring real time monitoring and alarm capability for network devices; providing periodic 7x24 on-call support; and assisting in the evaluation and lab testing of new equipment, protocols, tools and network services. A minimum of 5 years' experience in Data/Telecommunications industry in a network operations role. Must be skilled at using packet sniffers and an expert at router configuration and protocols. Familiarity with async modems, and a detailed knowledge of the Internet and its protocols and operation required. A BS degree in Computer Science or Electrical Engineering preferred.

SOFTWARE DESIGN ENGINEER
Desktop and Business Systems
As a member of the **Windows NT** development team, you will be responsible for enhancing various components which are part of the TCP/IP suite of protocols. This includes working on the TCP/IP stack itself and applications such as Telnet, FTP, IPR/LPD, DNS, RSH, and REXEC. A minimum of 2 years demonstrated programming experience in C and a strong familiarity with TCP/IP and related protocols a must. Demonstrated ability and interest in developing systems level software and knowledge of operating systems principles is essential. A BS or MS degree in Computer Science required.

SOFTWARE DESIGN ENGINEER
Desktop and Business Systems
As a member of the **Exchange** development team, your responsibilities will include working on the message transfer and storage for the Exchange Server. This includes working with key people owning other components of Exchange (client, server and MAPI layer) to track problems and do performance optimizations for client/server interactions. Demonstrated experience in client/server design and implementation, as well as strong Windows application design and development experience required. Multithreaded and client/server programming experience with OLE and Win32 APIs preferred. Skills in programming methodologies involving code core development for multiple platforms (Windows, Windows NT, Windows 95, MAC) desired. A BS or MS degree in Computer Science or a related technical discipline is required.

SOFTWARE DESIGN ENGINEER
Internet Platform and Tools
As a member of the **Normandy** development team, you will be responsible for designing and developing software for distributed security for Normandy which includes the areas of remote authentication, distributed access control, encryption, electronic billing and large scale private/public key infrastructure design. A strong networking and distributed security background with preferably NT programming experience. A BS or MS degree in Computer Science or related technical discipline preferred.

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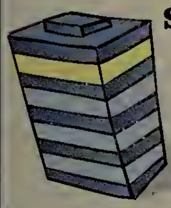
NetManage's newest version of ChameleonNFS is bolstered by its recent acquisitions of Xoftware and Syzygy.

How 'suite' it is: Vendors bundle software for intranets

BY PEGGY WATT

Looking for a browser, an HTML editor, some Web server software and database connectivity tools? Chances are, you won't have to look beyond a single vendor. From the client to the server, for the administrator, application developer, designer or user, the word in intranet circles these days is "suite."

As vendors fill out their intranet product lines, they're creating bundled offerings with all the tools needed for a particular intranet component. IT managers can pick among a range of suites that combine Web technologies or that integrate Web wares with existing systems, such as E-mail and databases.



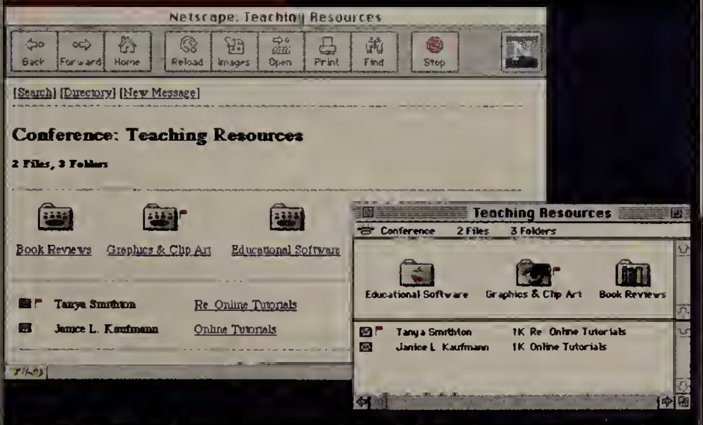
Suites

Distinct Corp. (distinct.com) has packaged a number of applications it previously sold via OEM channels in the Distinct IntraNet Suite. The company wants to provide several full-featured products, rather than a huge family of single-task applications, says Chris Apap-Bologna, marketing director at Distinct.

The suite includes Distinct NFS for file and program sharing; Distinct NetRover, which features basic intranet tools such as a browser, E-mail software, a File Transfer Protocol (FTP) client and a news reader; Distinct IntelliTerm, a terminal emulator; and Distinct Intranet Server, which is used for managing network resources. It also includes a few smaller utilities.

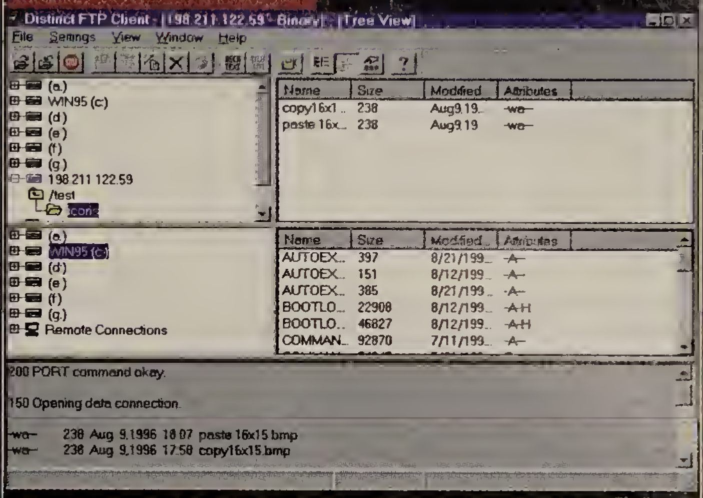
"Companies can mix and match the components, but we combine applications into a single interface," Apap-Bologna says.

FIRSTCLASS 4 SoftArc



FirstClass 4 keeps commands and interfaces consistent across Macintosh and Windows environments.

INTRANET SUITE Distinct



Name	Size	Modified	Attributes
copy16x1...	238	Aug9.19...	-wa-
paste 16x...	238	Aug9.19	-wa-

Name	Size	Modified	Attributes
AUTOEX...	397	8/21/199...	-A-
AUTOEX...	151	8/12/199...	-A-
AUTOEX...	385	8/21/199...	-A-
BOOTLO...	22908	8/12/199...	-A-H
BOOTLO...	46827	8/12/199...	-A-H
COMMAN...	92870	7/11/199...	-A-

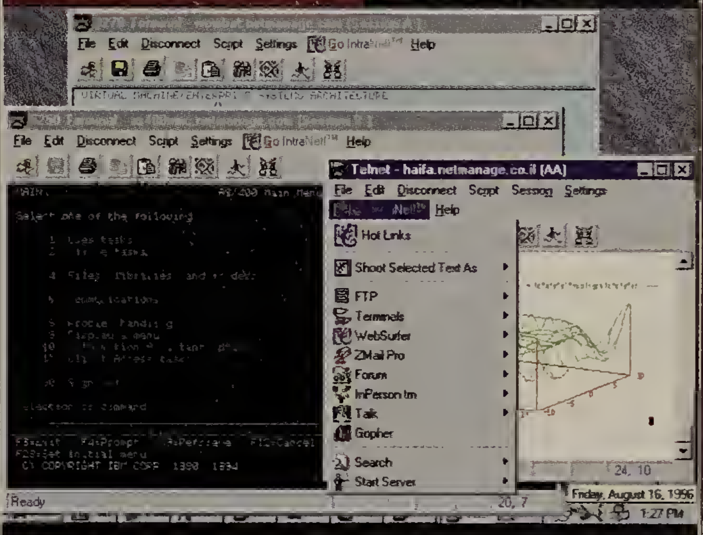
```
200 PORT command okay.

150 Opening data connection.

-wa-     238  Aug  9,1996  18:07  paste 16x15.bmp
-wa-     238  Aug  9,1996  17:58  copy16x15.bmp
```

The Distinct IntraNet Suite packages client and server applications into three main modules.

CHAMELEONNFS/X NetManage



The ChameleonNFS/X package now includes X Server emulation as well as a variety of network applications.

The suite, which costs $425, is available for Windows NT and Windows 95 environments.

NetManage, Inc. (netmanage.com) targets the intranet with its fall update and repackaging of the Windows-based ChameleonNFS/X, a desktop client suite. ChameleonNFS/X Version 6 bundles most of NetManage's client products, including its Network File System (NFS) applications for Unix integration, the X Server emulation program previously called Xoftware and the recently acquired Z-Mail Pro E-mail package.

The suite also provides a host of intranet management tools, such as those supporting remote management, bandwidth allocation and service-level selection. Additional modules provide data encryption and compression.

As part of the suite, NetManage also offers HostLink, its host access program. HostLink combines support for mainframes, midrange computers and IBM's System Network Architecture.

Z-Mail integrates with Chameleon's Web functions, says Fritz Mueller, product-line manager at NetManage. "If you're in E-mail and click on a link, the program brings up the URL inside the E-mail instead of jumping to a different application," he says.

The ChameleonNFS/X suite also includes a revamped version of Chameleon's news reader. It integrates with Z-Mail Pro and supports Multipurpose Internet Mail Extension (MIME) and HTML attachments through the E-mail functions. For intranet use, network managers can define groups and block unauthorized access.

Users also get a quicker way to access frequently used applications, through a new Go! IntraNet button on the application tool bar. By hitting the button, users get a menu of most common applications and Web hot lists.

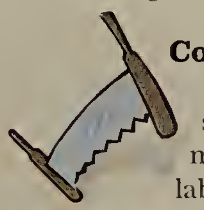
The updated ChameleonNFS/X suite will ship for all Windows environments by the end of the year, priced at $400 per single-user copy.

Another veteran suite developer, InterCon Systems Corp. (intercon.com) recently updated its cross-platform tcpConnect4 suites.

The tcpConnect4 applications are installed through a single interface and appropriate functions are integrated, says Dave Saunders, product manager at InterCon Systems. For example, the E-mail system can launch a browser and retrieve data if a URL link is included in a message.

The E-mail system also supports MIME and Apple's QuickTime multimedia program, so multimedia files can be played within messages. Other components with new or stronger features include the FTP client, the terminal-emulation program and the user interface, Saunders says.

The suite is available for Windows 3.1, NT and 95, as well as the MacOS. It comes in different editions, ranging in price from $115 to $495 for a single unit. Volume pricing and site licensing are available.



Collaboration tools

For the intranet, vendors are stretching the functions of their E-mail products to support more collaborative features.

For example, E-mail developer Baranof Software, Inc. (baranof.com) has created an E-mail management suite tailored to intranets. Mailcheck: Intranet Edition, which is available for $695, has built-in monitoring functions, viewers for different E-mail clients and support for common Internet protocols.

Mailcheck provides service reports that track and measure reliability, based on such factors as usage, response times, error counts and the consistent availability of links. "With an intranet, if you can't monitor it, you can't measure it and know whether you're meeting reliability goals," says John Casey, vice president of busi-

See Product Watch, *page 20*

InterCon Systems first shipped its internet tools for the Mac, but has brought its Windows products to parity.

PRODUCT WATCH

Baranof Software provides viewers that let users see E-mail messages from various systems in native format.

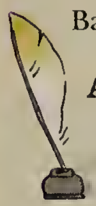
Product Watch, *continued from page 19*

ness development at Baranof.

Baranof also is working on integrating products from other intranet tool developers, notably NetManage and Netscape. Some Mailcheck information can be retrieved through Web browsers, and Baranof is working with Netscape to integrate with some Collabra groupware technology.

Mailcheck: Intranet Edition supports Post Office Protocol, Simple Mail Transfer Protocol (SMTP) and Simple Network Management Protocol.

In addition, Baranof plans to add to its intranet lineup this quarter a product called IP.Check. It performs real-time service-level monitoring of Internet and intranet services. IP.Check tracks usage and performance of FTP, HTTP, Network News Transfer Protocol and SMTP servers. Beta versions are available from Baranof's site on the World-Wide Web.



Authoring/development tools

One way to tell integration is for real: It's getting tougher to segment products. SoftArc, Inc. products (SoftArc.com) could easily fit into the Collaboration tools category, but the longtime E-mail developer heralds its newest version of the FirstClass product line as a development platform for messaging and groupware applications. FirstClass 4, scheduled to ship in the first quarter of next year, adds intranet and Internet access applications, a visual application development component and enhancements to existing groupware features.

"We're aiming this at companies that are looking to build some internal infrastructure," says Scott Welch, SoftArc vice president. "It's not just about publishing, it's about collaborating."

Welch describes the new application development functions as similar to Microsoft Corp.'s Visual Basic environment. It includes platform-independent Rapid Application Development tools and uses a simple Basic syntax.

Administrators can customize the collaborative functions, change menu options and defaults and link FirstClass 4 applications to SQL or Microsoft Open Database Connectivity (ODBC) databases, Welch says. "Or," he adds, "the manager can alter the whole environment with graphics or other aspects of the interface."

SoftArc bundles an icon library to get users started on tailoring the applications.

Other new management features include a message history function, which tracks the routes and readers of E-mail or newsgroup messages, Welch says.

SoftArc announced FirstClass 4 shortly after the August release of FirstClass 3.5, which added spell-checking, local replication of E-mail and discussions and some development functions through a Client Extension Toolkit. FirstClass 3.5 server licenses, including support for five clients, cost $495; additional user licenses range from $35 to $79, depending on volume. Pricing for FirstClass 4 will be announced upon its release.

Cognisoft Corp. (cognisoft.com), a startup cofounded by a number of former Microsoft employees, is working on a product that is not quite a development environment, but definitely a means of customizing the intranet. The product, called IntelliServ, is based on the information push model, which helps users retrieve only the information they want by letting them define interests and filter the data, says Ken Schneider, company president.

"We consider it a way to make user-initiated applications," Schneider says. "Intranets can be just another data source to overload users."

Users designate sources to monitor. Choices range from Web and file servers to collaborative environments such as Microsoft Exchange and Lotus Development Corp.'s Notes, and any ODBC database. Data sources can be inside or outside the firewall, Schneider says.

Just the Facts

INTRANETS IN ACTION

Administrative	50%
Personnel/inventory reduction	25%
Sales	10%
Various	15%

SOURCE: UTOPIA, INC.

What's more, users can set the IntelliServ system to scan for a vocabulary of terms, topics and word combinations. The system uses a combination of search engine technologies, Schneider says.

The program's notification manager delivers the information to the user in any of several designated methods, such as via a custom Web page, E-mail, on-screen alert notes or even by pager. Different data can prompt different response notices.

Network managers can monitor the information flow, and use the access trends to decide on changes in configuration or bandwidth, notes Tony Liano, Cognisoft's vice president of sales and marketing.

The program will run on Windows NT Server, but can interact with any Web server, Liano says.

IntelliServ is expected to ship in January. Pricing will be announced upon release, but is estimated at $5,000 for server licenses and $100 per client.

Borland International, Inc. (borland.com) is squarely in the development tools business, and is moving into the intranet space with offerings that bridge several of its existing technologies.

Borland's IntraBuilder family is a line of customizable intranet application suites that connect to a number of databases and include basic Web and browser components. All support Sun Microsystems, Inc.'s JavaScript and Microsoft's Active X controls, says Ross Dembecki, group product manager of Borland's intranet products.

IntraBuilder Professional includes Netscape's FastTrack Web server and the Navigator Gold page design program. It supports remote access to Borland's InterBase database server, as well as Microsoft SQL Server and most desktop databases.

IntraBuilder Client/Server includes IntraBuilder Professional plus drivers for major corporate databases, such as Oracle, Sybase, Informix and DB2, as well as ODBC support for others. This version also bundles Remote IntraBuilder Agents that enable distributed data management.

Borland also is releasing an entry-level version of IntraBuilder that includes the company's Personal Web Server plus Navigator Gold and supports Borland's Paradox and dBASE and other desktop databases.

"We want to bridge the worlds of client/server, intranets and object modeling," Dembecki says.

IntraBuilder includes a library of images, templates and scripts to help users get started. It can be used with Borland's database-oriented Delphi programming environment.

Available now, the entry-level product costs $99.95, the Client/Server edition is priced at $1,995 and IntraBuilder Professional is $499.95.

An application-specific but widely applied development tool and service tailored to intranets is available from CenTor Corp. (centor.com), which has a history of data organization and retrieval products. The company's CenWare software line provides authoring and retrieval tools, usually for putting existing catalog information in a form for online access — and, lately, access via Web browsers on an intranet.

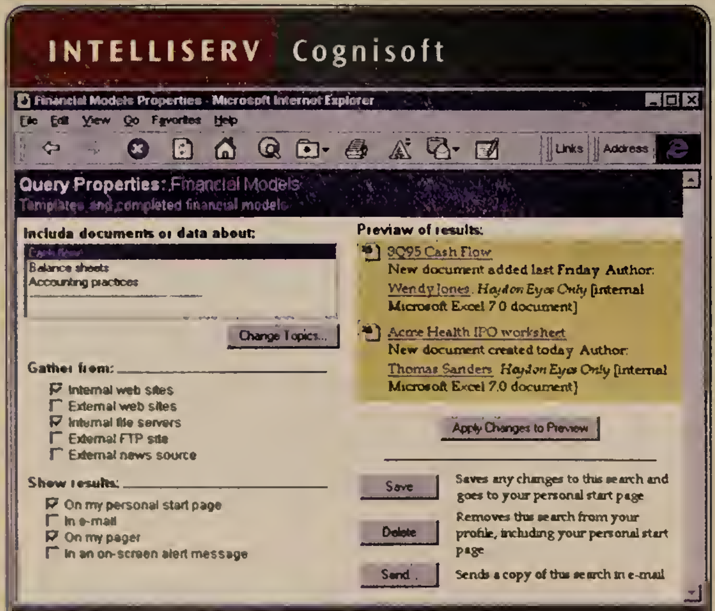
"We have some conversion tools to get most file formats into a form we can put onto a Web server," says Chris Nunez, CenTor chief technology officer and cofounder. The company started putting catalogs on CD-ROMs, and has expanded to support Web-based systems.

CenTor markets both the tools and the service for fees that vary with the project size, but in the range of $50,000 for a catalog of 10,000 entries, Nunez says. He acknowledges that's often a big bite-the-bullet initial cost to move from existing electronic formats to a Web design, but notes the switch makes the data more widely accessible and more easily updated.

Customers can contract with CenTor for content maintenance or they can do their own upkeep.

CenTor uses an HTML extension called HyperMedia Optimized Retrieval Format to index and manage the catalog data on a Web site, Nunez says. Developers can index on any desired fields or items, depending on the formats. The company also builds a series of query templates for common searches via Web browsers.

CenTor's technology is available on Unix, NetWare and Windows NT systems. ⊖



INTELLISERV Cognisoft

Financial Models Properties - Microsoft Internet Explorer

Query Properties: Financial Models

Templates and completed financial models

Include documents or data about:

Cash flow
Balance sheets
Accounting practices

Gather from:

☑ Internal web sites
☐ External web sites
☑ Internal file servers
☐ External FTP site
☐ External news source

Show results:

☑ On my personal start page
☐ In e-mail
☑ On my pager
☐ In an on-screen alert message

Preview of results:

9Q95 Cash Flow
New document added last Friday Author: Wendy Jones. *Haydon Eyes Only* [internal Microsoft Excel 7.0 document]

Acme Health IPO worksheet
New document created today Author: Thomas Sanders *Haydon Eyes Only* [internal Microsoft Excel 7.0 document]

Save	Saves any changes to this search and goes to your personal start page
Delete	Removes this search from your profile, including your personal start page
Send	Sends a copy of this search in e-mail

IntelliServ provides wizards to help users design queries that gather information and send a notice of findings.

Borland International's Golden Gate plan calls for linking intranet technology, objects and client/server tools.

Creepy, crawly COMMANDOS

Spiders combat disorder, chaos.

BY ADAM GAFFIN

Can an intranet be too successful?

For a while, it seemed that way at SGS-Thomson Microelectronics, a multinational concern headquartered in Paris. So many departments had set up Web servers for internal use that MIS had no way to track them — or the resources they housed.

On the other side of the Atlantic, Texas Instruments, Inc. was facing a similar problem: With a large and growing number of intranet sites, how would users ever be able to find information quickly?

Both companies turned to spiders for help. Spiders use recursive searching to catalog a network. An administrator points a spider at specific Web servers. The spider creates an index of the home pages on those servers, then follows the links from each page to other pages, which, in turn, are also cataloged and searched for new links. This continues until all linked information is indexed in a database on the spider's own server.

SPIDERS ON THE WEB

AltaVista:	http://altavista.software.digital.com
Harvest:	http://harvest.cs.colorado.edu
ht://Dig:	http://htdig.sdsu.edu/
Open Text Livelink:	http://www.opentext.com/livelink
Netscape Catalog Server:	http://home.netscape.com/comprod/server–centra1/index.html
Verity:	http://www.verity.com

Let the spider keep on indexing, and chances are it will eventually index virtually every Web site on the global Internet, assuming you give it enough disk space and a powerful enough processor to crunch all those millions of pages and links. That's the basic principal behind such public search engines as AltaVista, Webcrawler and Lycos.

Although created to catalog HTML documents, spiders also can index other types of documents, from those stored in the Adobe Systems, Inc. Portable Document Format (PDF) to Microsoft Word documents.

But as SGS-Thomson, TI and other companies that have unleashed spiders have learned, effective use requires a fair amount of planning to minimize the impact on the network and the servers being cataloged. To ensure a consistent look and feel for documents called up in a search, companies may also have to develop enterprise specifications for page design and formatting.

Fortunately for intranet managers, most spiders come with configuration files or other methods for limiting the scope of a search to a particular domain or set of servers. A growing number of spiders also track when they last visited a particular page. If the page has not been changed since the last visit, the spider goes on to another page.

Some spiders attempt to catalog a Web server in one visit, which can require off-hour runs. Others perform incremental indexing of sites, meaning they take several visits to create a catalog, reducing the load on those sites at any given moment.

Intel Corp., for one, uses both approaches. Each night, a series of spiders incrementally scans internal servers, so that the entire network is reindexed about once a week.

The other role of the spider is the one seen by the user: the search form and its underlying search engine. Each spider uses a different set of algorithms for matching user queries to items in the database, but typically some form of Boolean search is implemented. Any matching links are displayed in a menu that lets the user jump to those files with a mouse click.

As with other Internet-based technologies, the earliest spiders were developed by or at educational institutions. For example, Harvest was developed at the University of Colorado and Lycos at Carnegie Mellon University. Several companies, including Digital Equipment Corp., Netscape Communications Corp., Open Text Corp. and Verity, Inc., now either sell or are beta-testing spiders.

SGS-Thomson

SGS-Thomson Microelectronics couldn't wait for a commercial spider. Earlier this year, a corporate task force looking at intranet use realized it could not really map out any guidelines without first figuring out what was already up on the internal network, says Gilles Simon, corporate E-mail manager.

According to Simon, net managers knew a growing number of departments were setting up internal Web sites, but finding out how many and what they were publishing looked to be an impossible task in a worldwide enterprise. Suddenly, MIS had a new priority: "Control the anarchy or die," Simon says.

Simon says he and coworkers decided to try a spider as the first crack at Web asset management and to develop an enterprise infor-

See Spider, *page 24*

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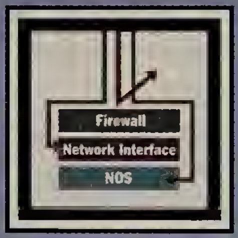
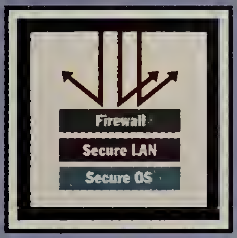


Standard Security Solution



CyberGuard Firewall 3.0

CyberGuard Firewall 3.0 offers Multiple Virtual Secure Environments capability, so you can divide a single physical network into multiple virtual networks, each with its own unique level of security. It also offers a Remote GUI manager, allowing economical administration and management of multiple firewalls from a central console. And since it runs on an Intel server platform, you can use affordable off-the-shelf hardware for your security system.

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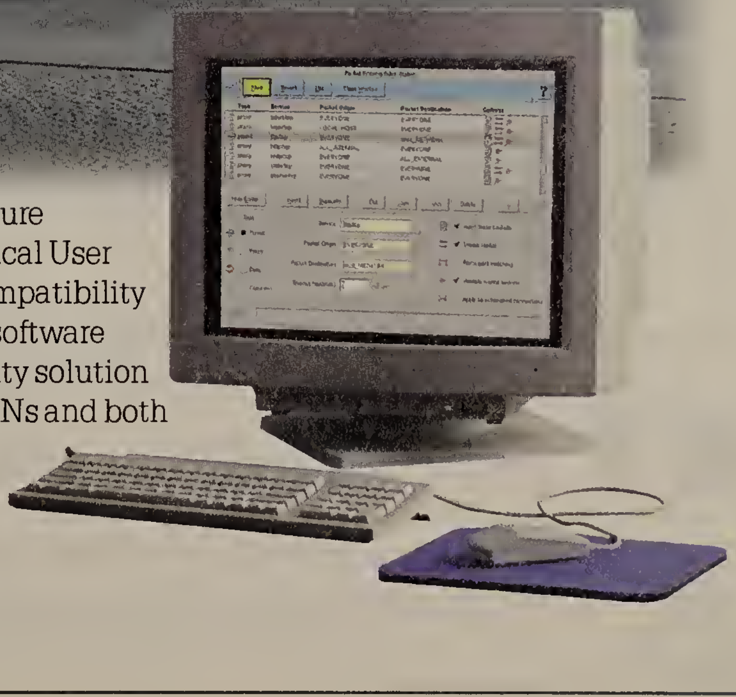
Visit our web site soon for the whole CyberGuard story. Because you can't afford any soft spots in your network.



Support for Multiple Virtual Secure Environments, a Remote Graphical User Interface manager and Intel compatibility mean CyberGuard Firewall 3.0 software delivers a hardened high-security solution on off-the-shelf hardware for LANs and both physical and virtual WANs.

Circle Reader Service ***#2***

Spider, *continued from page 21*

mation index. No commercial spiders were available, so SGS-Thomson turned to ht://Dig, a freeware Unix spider developed by a systems analyst at San Diego State University.

According to Simon, ht://Dig is relatively easy to set up via a configuration file, is efficient and can be set to limit its searches to servers within the company domain. The latter can be particularly important for efficient use, because otherwise the spider will follow links offsite and begin trying to catalog the entire Internet.

Every night ht://Dig is pointed at a list of known internal servers, with the hope that somewhere on them are links to new servers unknown to MIS.

To make information navigation easier for users, the company's MIS department is developing a Web style guide so that pages look consistent. At a minimum, the guide calls for use of HTML 2.0 (essentially, classic HTML plus tables) and Adobe Acrobat PDF for read-only information.

"The power of our intranet will be measured by its ability to get, retrieve and deliver the right information at the right time," Simon says.

No matter the content, the key is a powerful search engine. The spider, based on a Unix workstation, runs at night (in Paris) and takes about two hours to index 8,000 documents on 30

SPIN AWAY

Unleashing a spider requires forethought. Here are some issues to consider:

Do you need one?

If you only have a few servers, a spider might represent overkill. Even freeware spiders can represent a significant cost.

"Many corporations say, 'Hey, this is the newest trend, let's put it in,'" says Bryan Cromartie, a programmer/analyst with JLS Software Services, in Memphis, Tenn. "But the question is, 'How many documents do we have that change that rapidly?' "

If you have dozens of servers, or if your servers house thousands of documents, then spiders might be the only way to bring information order out of chaos, says Issac Roth, an intranet consultant with On-The-Net, a San Francisco-area consultancy.

How will others react?

Some people fear a spider will generate too much network traffic and drive up server usage, Roth says. In fact, "most robots are fairly well-behaved" and can be configured to minimize network and server impact. Internal Webmasters also can be a spidermaster's best friend. Many spiders require lists of Web sites to begin their search, something these employees can provide.

Minimize the impact

Run the servers in incremental mode at night or on weekends. And no matter how well-behaved, spiders need human supervision — they can choke on some files and hyperlinks, Roth says.

Stock up on drives

Make sure you have plenty of disk space, and consider limiting how much of a document is indexed. An index of 80,000 documents at Texas Instruments, Inc. takes 4G bytes of disk space.

Carefully limit the reach

Try excluding certain types of files from your search, such as compressed and graphics files. They can hang some spiders.

If your Web to SNA security is like the Titanic,

get ready to go down with the ship.

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Circle Reader Service #6

servers in Asia, Europe, the Pacific and the U.S. Users can access it via a central page dubbed SGS-Thomson City.

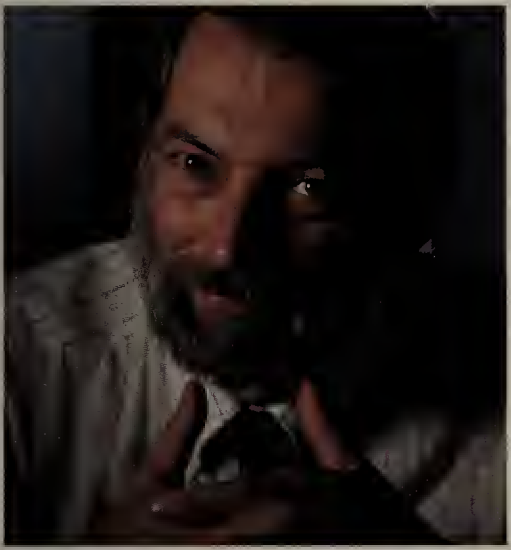
Texas Instruments

Like SGS-Thomson, TI has seen an explosion of internal Web use, says Don Rolph, manager of engineering system support at TI's Materials and Controls Group in Attleboro, Mass.

One thing the company wanted to avoid was replicating its experiences with a mainframe-based system that proved remarkably difficult to get information out of, he says.

Rolph set up a spider using Harvest, an early Webcrawling program that efficiently uses network and system resources, he says. Harvest is extensible (it comes with source code), is kind to networks and servers, and costs far less to install than its commercial cousins, he says.

Rolph quickly ran into three major problems. He found on a large network, such as TI's, an index can grow to monstrous size, certain file types can crash or hang the spider server, and finding servers not yet linked to indexed sites by hyperlinks can be a challenge.



SHAWN HENRY

The Harvest spider spins its web at TI, says Don Rolph, an engineering manager at TI.

Rolph says his spider currently requires some 4G bytes of disk space for an index of roughly 80,000 documents on 133 servers around the world.

The spider indexes HTML, text and PostScript files, along with C code and executable-file names. Next up are Word for Windows documents and Excel files.

"Full-word indexes of all documents will destroy virtually any corporate system," Rolph says. So he set Harvest to stop cataloging documents after a certain number of characters. He also excluded graphics files, which by their nature do not index very well, and Common Gateway Interface scripts — which can be large and which most users will never need to know about.

(Intel also uses Harvest for an internal spider. The company now runs multiple gatherers because it was taking just one spider as much as 24 hours to compile an index of the internal Web net, says a company spokesman.)

Harvest also proved unable to handle files compressed with the Unix command; they tended to hang the spider, Rolph says.

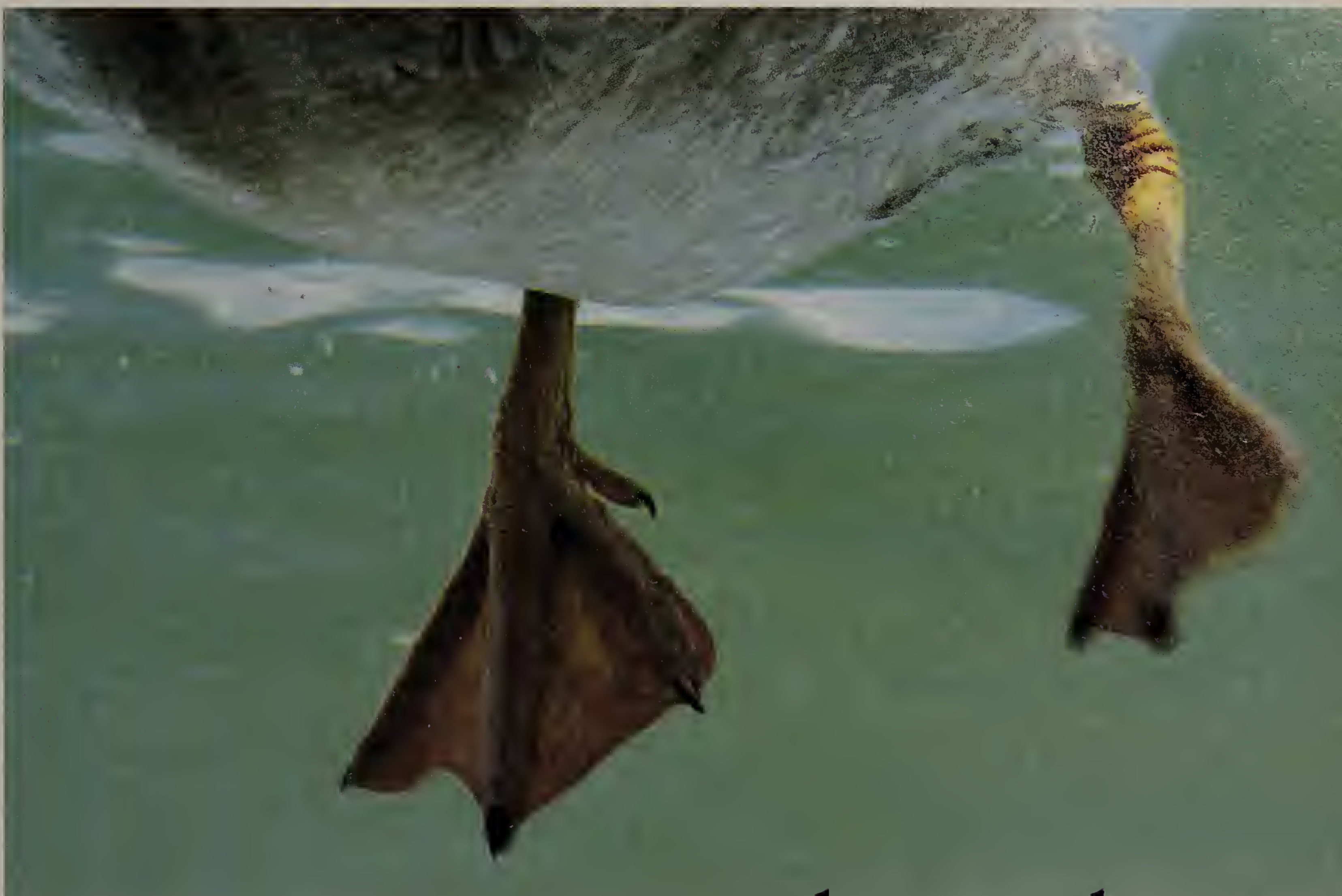
A number of files compressed with MS-DOS or Unix zip programs caused similar problems. As a result, the spider now excludes these file types.

Anyone within TI can set up a Web server. Webmasters are encouraged to register servers in a central directory, but this is hit and miss. "I use this as a starting point," Rolph says. "The spidermaster has to continually be on the lookout for new Web servers."

By design, Harvest indexes incrementally. This means the network is reindexed every two weeks or so. Because of this approach, the load on most servers is fairly low, Rolph says.

As for security, Rolph says it is up to local Webmasters to secure their servers so material not ready for enterprise access is kept private. This is done via both Unix file permission settings and robot.txt, a file that tells incoming spiders which files or directories to avoid.

At TI, the spider's popularity is spreading, Rolph says. "I now typically get several hundred queries a week." ⊜



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COOPERS & LYBRAND
GETS ON THE INTRANET TRAIN
WITH AN AMBITIOUS
CORPORATE KNOWLEDGE
BASE PROJECT

Making

STAN BAROUH

tracks

When a telecommunications consultant at Coopers & Lybrand LLP needs information to put together a client proposal, he immediately heads to the nearest subway stop – figuratively, that is.

A graphical subway station offers an entrance to Cooper & Lybrand Intellectual Capital (CLIC), one of the busiest stops on this young corporate intranet.

A consulting firm's intranet doesn't provide life-and-death answers like an emergency room database, or offer the kind of off-road access a remote construction crew might appreciate from a satellite hookup. But intellectual capital fuels many a corporation, and Coopers & Lybrand LLP is finding golden spikes in its intranet track.

"A consulting firm's product is an intellectual one. It's increasingly important for consultants to develop technological means of doing their work and producing that product," says John Clippinger, who developed the concept for Coopers & Lybrand's intranet before the World-Wide Web was even created.

[illegible] ctor of intellectual capital in Coopers & [illegible] ton-based National Office of [illegible] C[illegible]ppinger wanted t[illegible]ever- [illegible] l employees — [illegible] ess to [illegible] t [illegible]: a vast [illegible] [illegible] v from extern[illegible] h[illegible] trade [illegible]ress, newspapers and journals, [illegible] staff-writ- [illegible]orts and publications, and include outside stu[illegible]ws from specific industries served by Coopers [illegible] consultants.

Clippinger also [illegible]ed the use of a powerful search engine to find a[illegible]owledge base resources, which would be updated constantly. And he wanted employees to be able to get at the knowledge base whenever or from wherever they needed. In short, the knowledge base would fuel a company that deals in intellectual capital.

Learning & Education's mission is training and professional education, and growing such a repository was exactly the way to enhance corporate knowledge, Clippinger reasoned. Add communications and collaboration tools and the company could take better advantage of its own geographically dispersed resources. For example, analysts in different offices could discover their overlapping research and collaborate. Partners could share online subscriptions to professional publications instead of duplicating the orders.

His vision eventually resulted in CLIC, a growing online resource managed by the Learning & Education office. It has been available to a limited alpha audience for about two years, and is scheduled to be opened to the entire firm this for beta testing, and finally deployed by the end of the year. When CLIC flings open its doors, it will be but one site on an intranet that reaches all 16,500 Coopers & Lybrand employees worldwide.

Work on CLIC started early, but as word of its development seeped out and interest rose in the World-Wide Web, other business units in Coopers & Lybrand jumped on board the intranet train.

Other components of the Coopers & Lybrand intranet include the CyberLYB, which is expected to replace the firm's traditional libraries and make resources accessible regardless of geography. The internal Web also has a human resources section [illegible]ovides employee manuals, regulations and references online. And Coopers & Lybrand's intranet home page offers controlled links to outside sources, including customers and competitors.

Digging the subway station

Challenged to mobilize information across departments, Clippinger devised a knowledge base scheme that went beyond the capabilities of available technology. He planned to build CD-ROM libraries, which would be updated frequently and distributed widely across the Coopers & Lybrand network. Users would retrieve the information through a Lotus Development Corp. Notes interface, since the firm had committed to a corporatewide deployment of the groupware product.

ZIPPING ALONG

Company: Coopers & Lybrand LLP
Employees: 16,535
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Provides consulting for these industries: Energy, utilities and natural resources; financial services; government; health care; higher education; high technology; insurance; manufacturing; real estate; sales; telecom; transportation; venture capital.
Home page: http://www.colybrand.com.

Web technology changed the plan. The browser offers an easier, more intuitive desktop retrieval tool, and Web servers provided a clearinghouse for the disparate information sources. Coopers & Lybrand researchers could dial up clients' and competitors' public home pages or access familiar government databases through federal Web sites.

In 1993, Clippinger revamped his design and began testing an early version of CLIC, using shareware and giving limited access to corporate testers. He posted the first parts of the corporate knowledge base on an Apache Web server developed by the National Center for Supercomputer Applications and made it accessible via Mosaic browsers.

"A key design requirement was to automate the design of pages and make lots of links," Clippinger says.

Programmers from IT built Common Gateway Interface scripts that glued the Web server to existing databases, and CLIC architects combed the company's resources for databases to link in. All corporate white papers went online, for example, as well as research studies and even notations of projects in progress.

To ensure users would embrace CLIC, the developers decided it was crucial to involve them frequently, intimately and on a continuing basis through the life of the project. In fact, Learning & Education staff chose its alpha project partly based on which department was willing and interested in

See Coopers, *page 28*

Laura Higgins, project leader for Coopers & Lybrand LLP's CLIC intranet sites.

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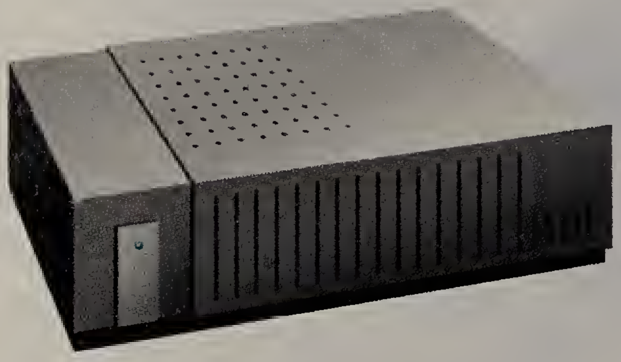

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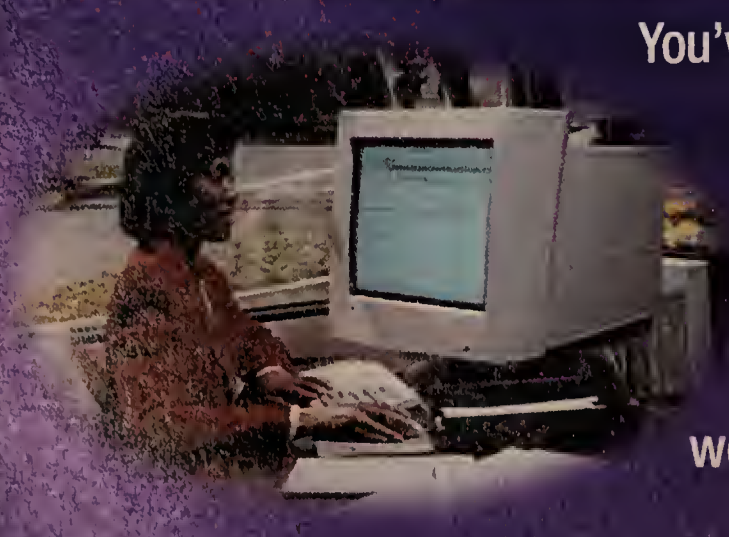

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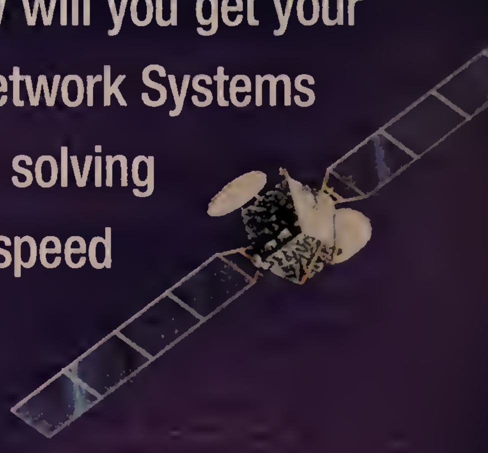

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Circle Reader Service #**3**

Coopers, *continued from page 27*

helping design the program. So, the first subway stop became the Telecom and Wireless industry group (recently renamed Infocom).

Construction phase

Laura Higgins, now CLIC project leader and fervent champion, joined Coopers & Lybrand to build that first online subway station. Getting the telecom industry unit's knowledge base on track took almost two years; now, thanks to Higgins' streamlining, the CLIC crew cranks 'em out at roughly six-month intervals.

Higgins asks partners and managers in each industry unit to commit to about three days of sketching out what they want on their site, implemented as a stop on the metaphorical subway line.

"We stay close to those users, because they are my clients. They help develop the taxonomy of the system we design for them," Higgins says. "If the users don't see the value in the product, and don't see how it will help them do their jobs, they won't use it."

Working with the telecom industry group, CLIC designers modeled a generic framework that has basic categories for resources and services. Common topics are vendors, competitors and issues. Subdepartments are usually specific to the industry groups.

One key feature is the Personal List, where users can bookmark frequently used links, save search queries and store topic lists, which they can group by project or client. "Users need to be able to tailor all of this into a desktop of information they want," Higgins explains.

STELLA JOHNSON

When he's not working the land, John Clippenger director of intellectual capital at Coopers & Lybrand, prepares corporate Web sites.

Another user-requested page is the Client Service Center, based on a generic design usable for all industry groups with some site-specific categories. It lists corporate resources by business units (such as accounting, finance or tax information), cross-indexed by industry category. Each Client Service Center also includes an industry-specific directory of related online publications, Learning & Education curriculum, a client database and links to client Web sites.

"Coopers & Lybrand clients want our consultants to have a big picture of their needs," Higgins says. "They want us to be current, and to know as much, if not more, about their industry as they do."

The task is daunting, but once consultants see the potential information gold mine in the intranet, they deluge the CLIC designers with requests for resources they want put online, Higgins adds.

Every CLIC page includes buttons to get online help, send feedback or call up site maps. Users requested this online map to help them retrace their steps and visualize where they found resources, Higgins says.

"The system complements what we had already with Notes and E-mail, but adds a lot of resources," says Bryan Kester, an associate with internal services for the Business Assurance practice in San Francisco.

Kester stumbled on the site while browsing through other parts of Coopers & Lybrand's intranet, which started to take shape about a year ago. He requested access, and Higgins gave him a password to test the system. He finds it a "phenomenal" resource and is eager for his business unit to get a subway stop.

"Our firm is trying to be on the cutting edge of information management, but we need something like this to cut through the jungle of information," Kester says.

Although Higgins and her associates have become adept at basic HTML, the heavy programming duties are shared by the in-house IT staff and Context Media, Inc., a Boston design firm Clippinger founded when he left Coopers & Lybrand last year. Today, the Learning & Education office outsources the bulk of the content-preparation duties to Context Media, which also uploads updates and monitors usage.

Higgins calls Context Media's contribution largely editorial; in-house IT maintains equipment but is not involved with content. In fact, IT has taken a low-key role, deploying technology on request but sharing decision-making about equipment with the intranet designers.

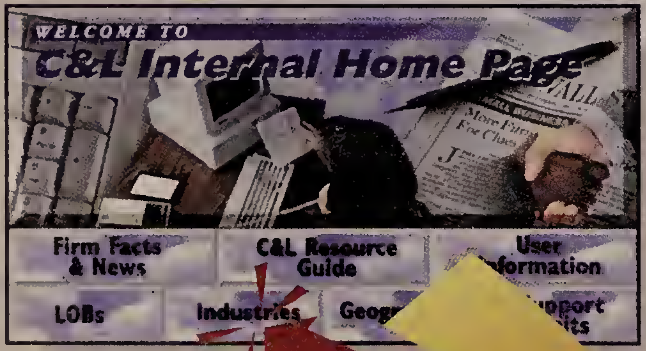
It helped when developing the first knowledge base that Higgins has a background in the telecom industry, but neither Clippinger nor Higgins thinks CLIC needs an in-house expert with every phase. Rather, giving the interest in CLIC, what the staff needs are more energy and time. The next

SITE SEEING

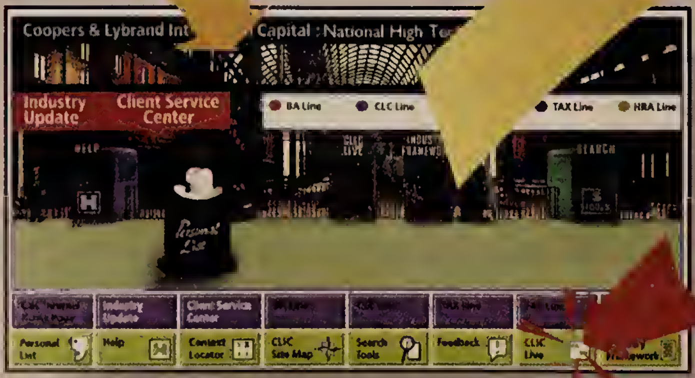
A step-by-step guide to Cooper & Lybrand's intranet

Research on the Web

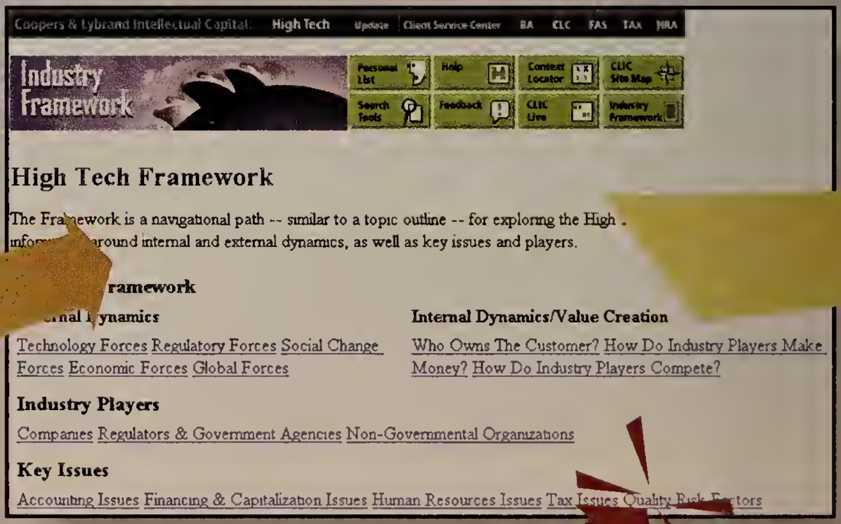
An associate partner in Coopers & Lybrand LLP's Business Assurance unit is collecting information for a report on conversion issues for the year 2000. She wants to find out what the company's client and prospective client IT departments are doing to prepare for the changeover to the year 2000. What's more, she wants to learn what practices the consulting firm's competitors are promoting regarding the issue.



❶ To begin her research, the associate partner logs into the corporate intranet. This brings her to the C&L Internal Home Page, which provides hotlinks to a variety of resources. She clicks on the Industries button to get to the home page for the National High Tech Group.



❷ The High Tech group's home page is part of the Coopers & Lybrand Intellectual Capital (CLIC) portion of the intranet. She chooses the Industry Framework button, figuring that will be a good place to start her search for background materials on the year 2000.



High Tech Framework

The Framework is a navigational path -- similar to a topic outline -- for exploring the High
info [illegible] around internal and external dynamics, as well as key issues and players.

ramework

rnal Dynamics
Technology Forces Regulatory Forces Social Change Forces Economic Forces Global Forces

Internal Dynamics/Value Creation
Who Owns The Customer? How Do Industry Players Make Money? How Do Industry Players Compete?

Industry Players
Companies Regulators & Government Agencies Non-Governmental Organizations

Key Issues
Accounting Issues Financing & Capitalization Issues Human Resources Issues Tax Issues Quality Risk Factors

❸ The researcher goes to the Key Issues portion of the High Tech Framework page and hits the link for Quality to drill down to the next topic level.

CLIC subway stop went to the High Tech industry group; further down the line will come sites for Insurance, Financial Services, Health Care, Energy & Natural Resources, and the remaining industry groups.

Elsewhere on the line

Just as the first CLIC station was going into alpha, Coopers & Lybrand's management took a step that made life much easier for the early intranet architects: It decreed companywide adoption of Netscape Communications Corp.'s Navigator browser. The CLIC staff yanked the Mosaic browsers off the few dozen test desktops and gleefully started crafting Web pages tuned to Navigator. Likewise, CLIC's Apache Web server gave way to a Netscape Commerce Server also running on Unix, which is now standard for Web servers installed throughout the corporation.

Praise for CLIC and consultants' requests for access to external Web resources convinced Coopers & Lybrand's management to deploy browsers on every desktop. And that decision in turn nudged other departments in the company into contributing to a truly corporatewide internal Web.

"This has been a big opportunity for us to pull together our core business systems," says Tracy Beverly, manager of Desktop Information Services, which is part of the Knowledge Management Group (KMG), a newly created organization that focuses on intellectual capital and oversees the corporate libraries and online resources, including the intranet but excluding CLIC.

KMG, which is housed in Coopers & Lybrand's New York headquarters, combines the company's former Market Risk & Analysis Group, now called Knowledge Strategies Group; Learning & Education; and the IT unit. The group is charged with planning technological development in the firm, which even has a chief knowledge officer.

Not quite a year ago, CLIC became one of several option buttons on Coopers & Lybrand's internal home page. Beverly acknowledges the Learning & Education group's effort as "one very well done piece" that helped inspire construction of the larger intranet, which now runs on two Commerce Servers. She points to other projects, such as CyperLYB, starting to blossom.

"We're transitioning our libraries from brick and mortar to electronic data," Beverly says of the CyberLYB project.

The CyberLYB is becoming a virtual repository for the entire company, liberally applying hyperlinks to CLIC and other sites at various departments, which are converting their library resources to electronic form. The result will make library materials available to all Coopers & Lybrand staffers regardless of geographic location.

The CyberLYB also is the central site for online services to which Coopers & Lybrand subscribes, such as the Dow Jones News Retrieval service and numerous online newsletters from market research organizations like Datapro Information Services Group and International Data Corp.

Another page, the Tax News Network, was designed by a Washington, D.C. group of tax directors. It includes a newsletter, news feeds and numerous white papers. Because it is accessible to customers via the Internet, it is housed on a separate server from the other intranet pages.

Beverly's five-member staff helps interested groups build their own Web sites, and also tries to track down and link in the unofficial internal sites springing up throughout the company. CLIC was a self-contained, creative project, but other groups are happy to follow KMG's templates for getting online.

Sometimes her staff prepares content, such as travel policies. Other times, it offers consulting or teaches courses to departments that want to put up Web pages.

"We try to keep the content as close as possible to the people who own it," Beverly says. "Our job is to jump-start and troubleshoot."

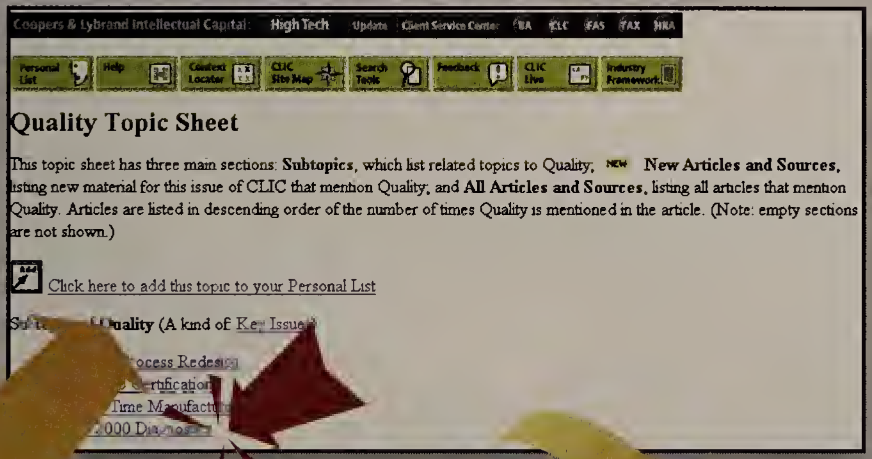
Other options on the Coopers & Lybrand internal home page lead to the audit, tax and human resources departments, Newsbytes custom news feed and even to selected World-Wide Web sites, such as customer pages or controlled-access sites run by market research organizations. The home page also links to Coopers & Lybrand's existing Notes servers, which are very much part of the intranet.

"Notes lets us give people their personalized view and their own documents, and they can maintain the content," Beverly says.

CLIC TIPS

To assess design and content needs, the architects of the Cooper & Lybrand Intellectual Capital Web site ask users these questions:

- What resources do you use in your job?
- What existing resources do you find hard to access?
- What are your typical daily tasks?
- How important is timeliness?
- What types of information do your clients request?



Quality Topic Sheet

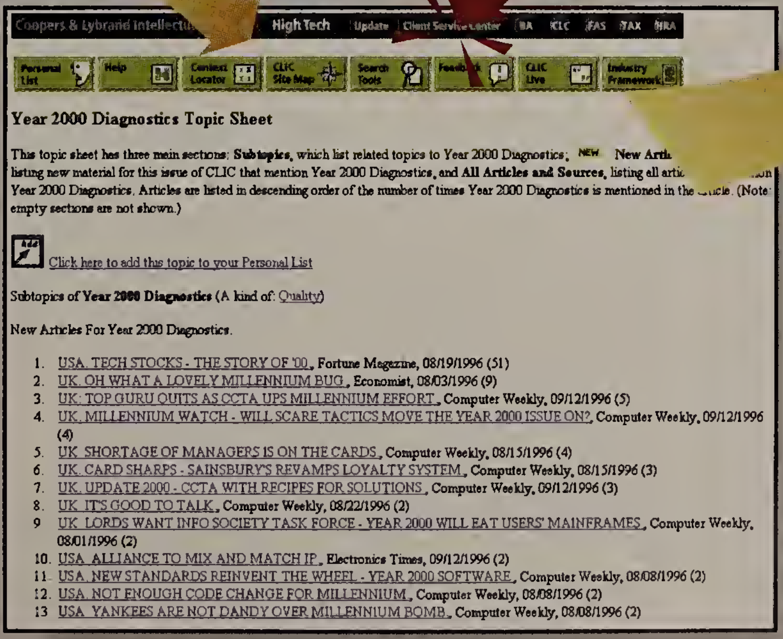
This topic sheet has three main sections: **Subtopics**, which list related topics to Quality; NEW **New Articles and Sources**, listing new material for this issue of CLIC that mention Quality; and **All Articles and Sources**, listing all articles that mention Quality. Articles are listed in descending order of the number of times Quality is mentioned in the article. (Note: empty sections are not shown.)

Click here to add this topic to your Personal List

Su[illegible] **Quality** (A kind of Key Issues)

[illegible]ocess Redesign
[illegible]ertification
[illegible] Time Manufactu[illegible]
[illegible]2000 Diagnostics

❹ The researcher scrolls through the Quality Topic Sheet and finds just what she needs: a hotlink for Year 2000 Diagnostics. She clicks on it.



Year 2000 Diagnostics Topic Sheet

This topic sheet has three main sections: **Subtopics**, which list related topics to Year 2000 Diagnostics; NEW **New Arti**[illegible] listing new material for this issue of CLIC that mention Year 2000 Diagnostics, and **All Articles and Sources**, listing all artic[illegible] Year 2000 Diagnostics. Articles are listed in descending order of the number of times Year 2000 Diagnostics is mentioned in the [illegible]. (Note: empty sections are not shown.)

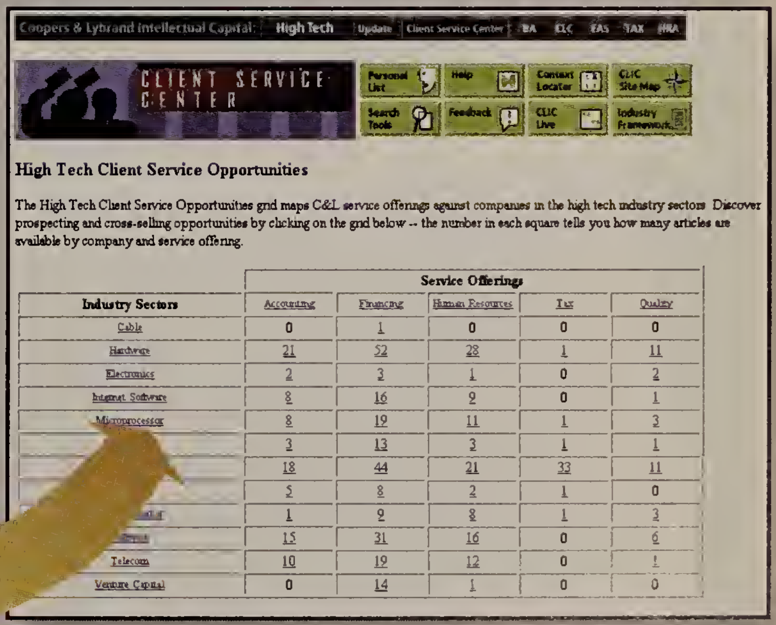
Click here to add this topic to your Personal List

Subtopics of **Year 2000 Diagnostics** (A kind of: Quality)

New Articles For Year 2000 Diagnostics.

1. USA: TECH STOCKS - THE STORY OF '00., Fortune Magazine, 08/19/1996 (51)
2. UK: OH WHAT A LOVELY MILLENNIUM BUG., Economist, 08/03/1996 (9)
3. UK: TOP GURU QUITS AS CCTA UPS MILLENNIUM EFFORT., Computer Weekly, 09/12/1996 (5)
4. UK: MILLENNIUM WATCH - WILL SCARE TACTICS MOVE THE YEAR 2000 ISSUE ON?, Computer Weekly, 09/12/1996 (4)
5. UK: SHORTAGE OF MANAGERS IS ON THE CARDS., Computer Weekly, 08/15/1996 (4)
6. UK: CARD SHARPS - SAINSBURY'S REVAMPS LOYALTY SYSTEM., Computer Weekly, 08/15/1996 (3)
7. UK: UPDATE 2000 - CCTA WITH RECIPES FOR SOLUTIONS., Computer Weekly, 09/12/1996 (3)
8. UK: IT'S GOOD TO TALK., Computer Weekly, 08/22/1996 (2)
9. UK: LORDS WANT INFO SOCIETY TASK FORCE - YEAR 2000 WILL EAT USERS' MAINFRAMES., Computer Weekly, 08/01/1996 (2)
10. USA: ALLIANCE TO MIX AND MATCH IP., Electronics Times, 09/12/1996 (2)
11. USA: NEW STANDARDS REINVENT THE WHEEL - YEAR 2000 SOFTWARE., Computer Weekly, 08/08/1996 (2)
12. USA: NOT ENOUGH CODE CHANGE FOR MILLENNIUM., Computer Weekly, 08/08/1996 (2)
13. USA: YANKEES ARE NOT DANDY OVER MILLENNIUM BOMB., Computer Weekly, 08/08/1996 (2)

❺ On the Year 2000 Diagnostics Topic Sheet, the researcher finds a list of articles about the issue gleaned from online publications and news services to which Coopers & Lybrand subscribes. Before selecting which articles she'd like to see in full, the researcher decides to check out what services the firm offers to address issues surrounding the year 2000. So, she clicks on the Client Service Center button in the toolbar and works her way to the High Tech options.



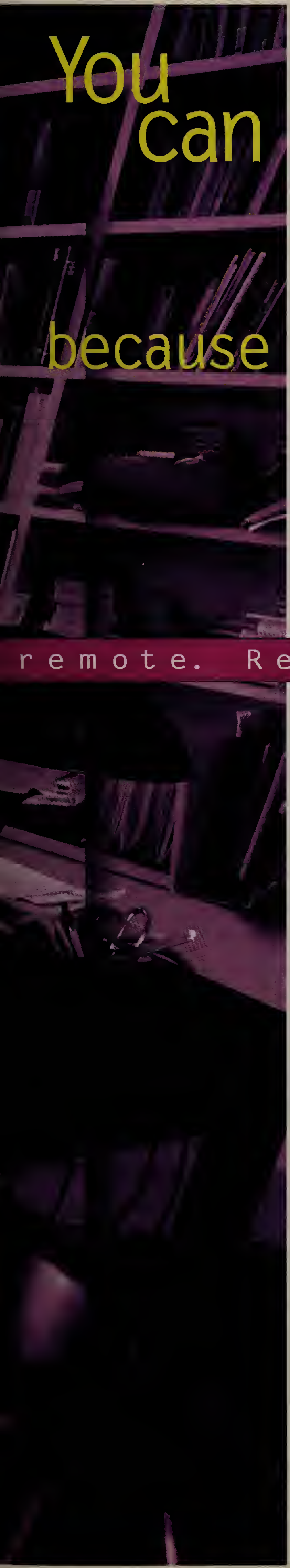
High Tech Client Service Opportunities

The High Tech Client Service Opportunities grid maps C&L service offerings against companies in the high tech industry sectors. Discover prospecting and cross-selling opportunities by clicking on the grid below -- the number in each square tells you how many articles are available by company and service offering.

	Service Offerings				
Industry Sectors	Accounting	Financing	Human Resources	Tax	Quality
Cable	0	1	0	0	0
Hardware	21	52	28	1	11
Electronics	2	3	1	0	2
Internet Software	8	16	9	0	1
Microprocessor	8	19	11	1	3
[illegible]	3	13	3	1	1
[illegible]	18	44	21	33	11
[illegible]	5	8	2	1	0
[illegible]	1	9	8	1	3
[illegible]	15	31	16	0	6
Telecom	10	19	12	0	1
Venture Capital	0	14	1	0	0

❻ The researcher can use this matrix of services to find lists of articles or reports different Coopers & Lybrand groups have produced on the year 2000. The researcher gathers the data on the year 2000 housed on the intranet and begins her analysis.

More than



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Circle Reader Service #7

Coopers & Lybrand is installing Lotus Domino servers to enhance its Notes-Web connection. But the technologies already dovetail nicely; for example, one Web site lets users search a directory of the contents of the company's Notes servers, and then hyperlink to the appropriate server.

Although having a widespread Notes installation presented some technological challenge until the release of Domino, the presence of the groupware was also a boon when it came to the intranet, several of its architects say.

"Notes had introduced the idea of sharing, of collaborative teams," Clippinger says. "The intranet enhanced the knowledge flow."

What's more, it set the stage technologically. Because Notes is widely deployed, most Coopers & Lybrand employees have reasonably powerful systems to accommodate Notes' hefty hardware needs.

All employees, regardless of location, have 486 or Pentium systems; many of the partners have laptops and docking stations. Navigator's installation was accompanied with an influx of modems.

Down the track

CLIC is a case study of long, careful planning and testing but quick deployment once the train got on the track. Its architects understandably have their eyes on the future as well.

"We're excited about the potential of satellite hookups and real-time videoconferencing," Higgins says. "As Netscape evolves, we'll be able to implement innovations such as multimedia E-mail and full-blown discussion groups." The name for it: CLIC Live.

Besides launching CLIC subway stops for the remaining industry groups, the Learning & Education group is posting various existing courseware for access through Web servers. For example, interactive courseware is in the works.

Client access to appropriate portions of the intranet via the Internet is another likely enhancement.

"The big question is security," Higgins says. Coopers & Lybrand employees access the Internet through a proxy server and firewall. She also expects the intranet will have to accommodate more diverse systems in the future. As IT upgrades to Windows 95, for example, users may want to dial in with Microsoft Corp.'s Internet Explorer browser.

But Cooper & Lybrand's careful planning and testing, to work out the bugs before deployment, should help its intranet grow more quickly in the future, Higgins notes.

"Companies shouldn't be scared to take their time," she says. "It's easy to get caught up in the advances in technology and leap in," often to a less than useful result.

She credits Clippinger and Judy Rosenblum, a former Coopers & Lybrand executive who shepherded the proposal through management, as visionaries who heralded an unproven but promising venture. What's more, Coopers & Lybrand was willing to write the check as a long-term investment, without expecting immediate or dramatic return. But those involved agree that such an ambitious project hasn't a chance without an angel at the top.

"You have to have somebody powerful, well-respected and committed to the concept to push it," Higgins says.

The fact that Coopers & Lybrand's first steps to an intranet came from the Learning & Education group shows the company's commitment to intellectual capital, Higgins points out. Organization of the KMG also provides evidences of that philosophy. And both Beverly and Higgins attest to widespread user acceptance of the growing knowledge base.

"When we began to design CLIC, we bit off a lot," Higgins says. "We looked to capture and leverage intellectual capital assets." Because the focus is on content, instead of the technology, the first visible benefits are in productivity rather than financial results. And that's the capital a knowledge company seeks; the other kind follows. ⊖

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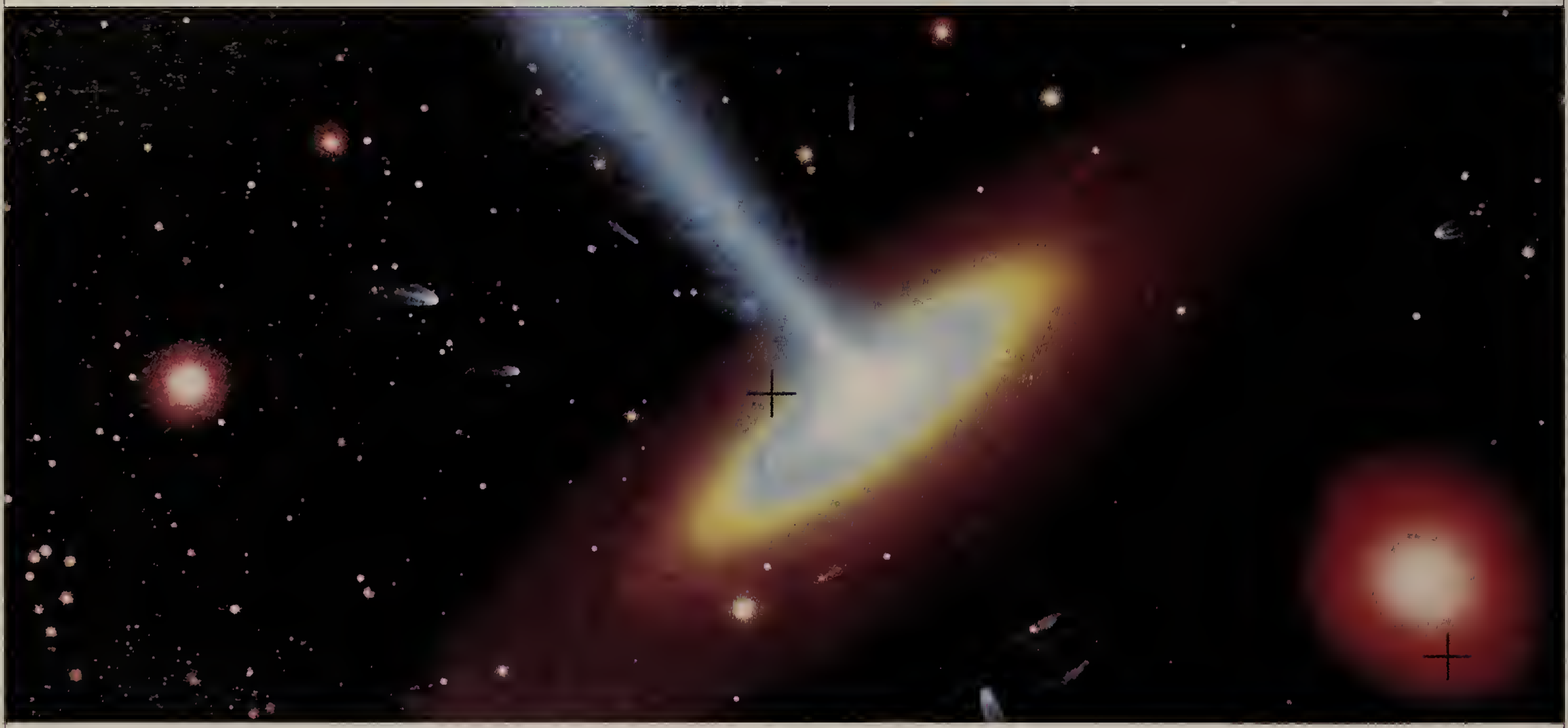

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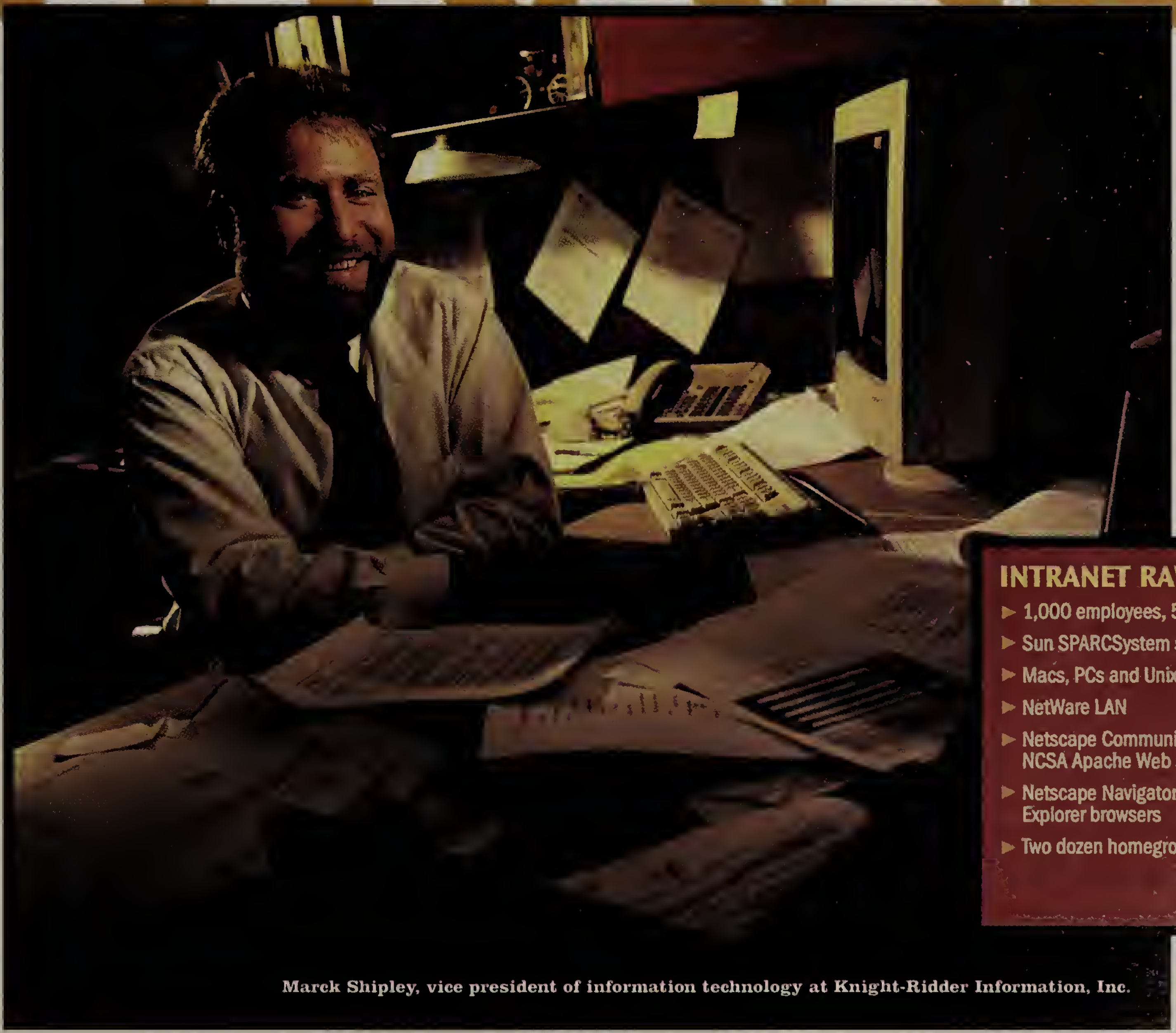
Circle Reader Service #14

Mission INTRANET

Knight-Ridder Information juggles policies, preferences and personnel to build its Web.



INTRANET RAW MATERIAL

- 1,000 employees, 500 of them remote
- Sun SPARCSystem servers
- Macs, PCs and Unix workstations
- NetWare LAN
- Netscape Communications Server and NCSA Apache Web servers
- Netscape Navigator, Microsoft Internet Explorer browsers
- Two dozen homegrown Web pages

Marck Shipley, vice president of information technology at Knight-Ridder Information, Inc.

ERIC MILLETTE

PROJECT IntrA-Net
Part 1 of a series.

This is the first in a series of articles following the development of an intranet at Knight-Ridder Information, Inc., a 1,000-employee information services firm in Mountain View, Calif. The company has launched an ambitious rollout schedule for linking its local and remote offices. In this first installment, we describe the evolution of the intranet concept, its rapid prototype and the steps to come.

BY PEGGY WATT

Knight-Ridder Information, Inc.'s IT manager insists his company is an intranet novice, but this beginner had several dozen working Web sites even before drawing up the blueprints for a formal corporate system.

Like many corporations that have caught intranet fever, renegade sites started popping up at Knight-Ridder Information last year. Employees who were exploring the World-Wide Web decided it was a great way to collaborate, so they simply loaded public domain (usually Unix) Web servers on their workgroup machines. Personal home pages, many festooned with original art and family photos, soon proliferated.

But Marck Shipley, Knight-Ridder Information's vice president of information technology, hasn't had time to build his own home page. He's been too busy managing the intranet stampede. In fact, the IT department was one of the first to set up a prototype home page. It lists resources, offers forms that can be used to request information or equipment and enables users to report problems.

Shipley is just one of the company's division heads who have already put up departmental Web sites and are sold on the intranet concept. In April, he was charged with assembling a prototype to demonstrate to upper management how the technology could benefit additional departments and the company as a whole.

The first prototype pages, accessible by all employees, went live in August. Corporate management will decide by year-end whether to adopt the internal Web architecture and expand it.

See Knight-Ridder, *page 38*

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Circle Reader Service #18

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Knight-Ridder, *continued from page 35*

The intranet experiment is unfolding rapidly and simultaneously with Knight-Ridder Information's overhaul and expansion of its World-Wide Web presence. That project is handled by a different group comprising a mix of corporate departments. But participants in the two projects are sharing ideas and information and plan to keep the design of their Web pages similar for the sake of consistency.

Data at the core

Knight-Ridder Information is no stranger to online information management and distribution. The company includes the former Dialog information service, which Knight-Ridder Corp. acquired last year. It is a sister corporation to the Knight-Ridder publishing group, which includes more than four dozen newspapers and broadcast stations.

The information arm of the company packages and markets not only some of the voluminous product of these siblings, but also information from other sources, such as databases from Standard & Poor's, Dun & Bradstreet Corp., Reuters and the U.S. Patent and Trademark Office.

Royalties for obtaining such third-party information for resale can be high, and one of the benefits Shipley suspects an intranet will provide is a way to keep closer tabs on those costs. He decided to give employees easy access — via their Web browsers — to timely information about customer use of data and the company's costs for the databases accessed. Closer monitoring of up-to-date numbers could help Knight-Ridder Information better determine if it overpays for what it resells.

INTRANET INFRASTRUCTURE

Knight-Ridder Information's IT group is deploying its prototype intranet across its existing network infrastructure, which includes a 100Base-T backbone, with 10Base-T to the desktops.

The corporate LAN runs Novell, Inc. NetWare 4.11, and users have a mix of Unix, Macintosh and Windows systems. But every desktop also has either a Netscape Communications Corp. Navigator or Microsoft Corp. Internet Explorer browser.

The network connects 500 employees at the company's Mountain View, Calif., headquarters and another 500 employees across a WAN to remote sites, the largest of which comprises 100 employees in Colorado.

To make that customer information Web-accessible, IT first built a prototype Web site designed as an internal customer management tool, dubbed Excaliber. It runs on a Netscape Communications Corp. Communications Server, so users can access it with any browser.

Excaliber's home page has a selection of buttons that bring up customer information sorted by factors such as customer number, payment status or services ordered.

Clicking on a button on the Web page activates a Perl or bin script that retrieves customer information from the Oracle7 database where it resides. Users can view the information in tables or graphs, sorted as they choose.

A subset of Excaliber is the Roysys royalty-tracking system. Through the company's Web page, users can get information about Knight-Ridder Information's contracts with database providers. That information helps employees balance usage and cost, and having it easily available may help Knight-Ridder Information negotiate better contracts the next time around, Shipley says.

Before Excaliber, an employee seeking such data had to ask an IT staffer to ferret the information from the Oracle database and run a report. Shipley says IT will be happy to ditch that chore. Authorization to access the database is controlled by the same security measures provided through the LAN.

"We've built a real-world application for distribution through the intranet," Shipley says.

Excalibur is just one selection on Knight-Ridder's home page. And while it is arguably the most complete site on the intranet, there are several other destinations.

Pages link to work, leisure

Some home page options lead to Web pages and resources of other departments, such as human resources, finance and IT. Most departments at least have a home page, Shipley says, and some are designing a series of sites.

One option on the home page is a Service Request System that lets users enter requests for help and bug reports. The page also features a suggestion box and survey. An "After Hours" button lets users peruse movie listings and information on other local entertainment, and "Cafeteria" shows the menu choices in the company cafe.

There is also a link to a Table of Contents page with a whole different selection of buttons, many of them personal Web pages designed by employees. IT dispatched digital spiders to find and record the existing Web pages before setting up shop.

"I don't want to have to manage all those servers, but I'll help make them more visible," Shipley says. "It's to our benefit to get as many people as possible familiar with Web servers and HTML and information distribution."

Because the earliest intranet pages — especially personal home pages — appeared autonomously, they exhibit a potpourri of colors and styles. Shipley encourages departments to look at the pages for inspiration and creative design. The IT staff will help other departments design their pages, if requested, and can provide templates to help groups get started. But Shipley says he imposes few design requirements.

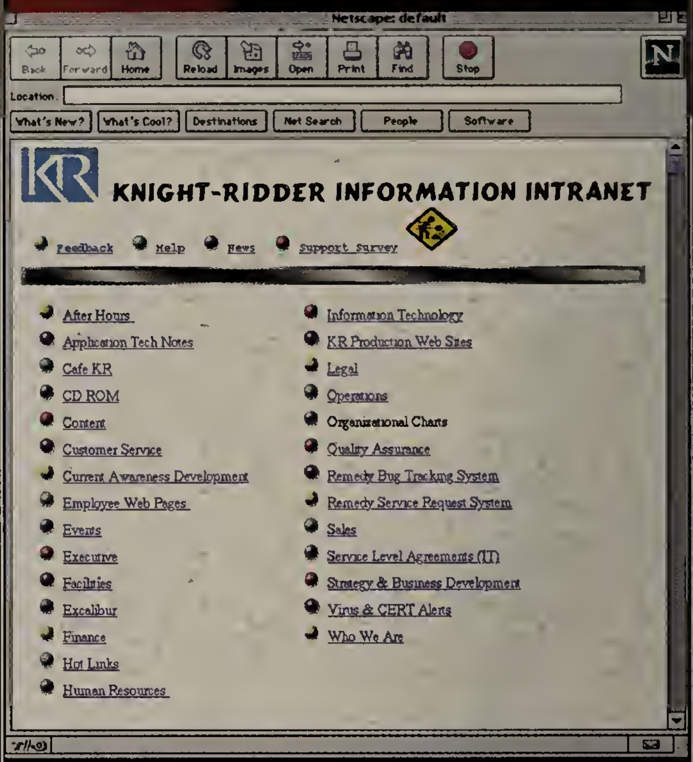
"We give people a lot of freedom here to try new things," he says. And for personal home pages, imagination is almost the only limit. Shipley believes those pages help employees get to know each other better. For example, an employee might display in the office a few family photos or a picture that hints of a favorite pastime, but a personal home page can communicate much more information — some of it even work-related, he adds ruefully.

However, he does impose one restriction for security purposes. Although many of the intranet pages link to external pages on the actual World-Wide Web, pages on the Internet cannot link to Knight-Ridder Information's intranet. A firewall blocks the links.

The actual design of the corporate Web site is still fluid. Shipley and members of his staff sketched out the initial design for the corporate home page and Excaliber. First, they wrote a wish list of page attributes: what should be included, what it should look like, what should link to what. They drew some concepts from the personal home pages they visited.

Shipley says he's still fine-tuning the prototype so the pages will look good on any of the diverse monitor types used in the company. Notably, all of the prototype Web pages feature lots of feedback opportunities. Shipley wants employees to try out the pages and let him know what they think.

HOME PAGE Knight-Ridder Information



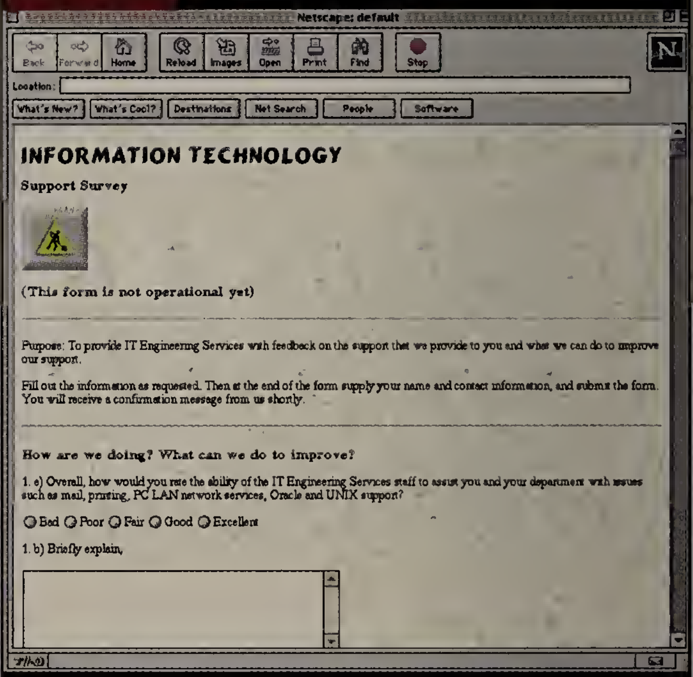
KNIGHT-RIDDER INFORMATION INTRANET

Feedback · Help · News · Support Survey

After Hours	Information Technology
Application Tech Notes	KR Production Web Sites
Cafe KR	Legal
CD ROM	Operations
Content	Organizational Charts
Customer Service	Quality Assurance
Current Awareness Development	Remedy Bug Tracking System
Employee Web Pages	Remedy Service Request System
Events	Sales
Executive	Service Level Agreements (IT)
Facilities	Strategy & Business Development
Excalibur	Virus & CERT Alerts
Finance	Who We Are
Hot Links	
Human Resources	

Knight-Ridder Information's intranet is still a work in progress, but it provides an array of resources.

IT PAGE Knight-Ridder Information



INFORMATION TECHNOLOGY

Support Survey

(This form is not operational yet)

Purpose: To provide IT Engineering Services with feedback on the support that we provide to you and what we can do to improve our support.

Fill out the information as requested. Then at the end of the form supply your name and contact information, and submit the form. You will receive a confirmation message from us shortly.

How are we doing? What can we do to improve?

1. a) Overall, how would you rate the ability of the IT Engineering Services staff to assist you and your department with issues such as mail, printing, PC LAN network services, Oracle and UNIX support?

○ Bad ○ Poor ○ Fair ○ Good ○ Excellent

1. b) Briefly explain,

The IT department invites users to make suggestions on its home page and ask questions in an online survey.

To coordinate the next phase of the prototype, Shipley has organized a cross-departmental committee of about a dozen members. They are sharing ideas about what to build next, and drawing up some design concepts. The committee also is gathering user comments on the beta version for an ongoing progress report it passes out to Knight-Ridder Information officers.

One big future enhancement will be to link in remote employees. Shipley and some selected users can access the intranet from outside via designated Internet service provider nodes, but he wants to devise a way for remote offices and traveling employees to dial in — securely — via the Internet.

If the intranet becomes a permanent and maturing part of the Knight-Ridder Information network, Shipley wants to give customers access, with appropriate security, of course. For example, a customer would be able to retrieve account information, leave requests for changes in their service and make support queries online.

But for the moment, Shipley just wants everybody at Knight-Ridder Information to wield Excaliber and tell him what they think. ⊖

Amaze your customers

Put account and order data right before their very eyes.

RANDEE LADDEN

BY JIM STERN

After a wild, wacky, wonderful honeymoon with the Internet, the folks in marketing are waking up to the fact that this intranet thing may be just as profound.

Marketing executives are realizing they can leverage the intranet to further their goals of getting the word out, hauling in prospective customers and keeping tabs on the changing marketplace.

Just like others in your company who need to send and receive information (that's everybody, by the way), the good people in marketing need to keep informed and disseminate information throughout the organization.

It's time to cross the line. The winners of tomorrow will offer their customers access to applications and databases previously considered "Internal Use Only." They will open the doors to the Communication Zone.

If the new product launch is to go off without a hitch, then the price sheets, trade show schedules, positioning papers, production schedules, competitive analysis and press releases need to be drafted, reviewed, approved and then distributed at once and to many. Companies usually call this process workflow.

Competitive information also needs to fly when corporate competitors launch their products.

Online discussions about product plans shrink time to market for Microsoft Corp. Interactive calendars on the company network smooth scheduling at Sun Microsystems, Inc. Are you that wired yet?

John McCraken, chief executive officer at Silicon Graphics, Inc., boasts that his company can have a videotaped rundown on a competitor's product on the SGI intranet within 24 hours of the announcement. Are you that competitive yet?

These are the powers of an internal communications system that are rapidly becoming part of the way America does business.

The network is the computer? Forget it. The network is the company. We're going toward mass publication and serious online workflow. That's good. But your customers want direct access, as well, and your marketing department can achieve its goals faster if the line between the external Web site and the intranet becomes less of a line and more of a zone — call it the Communication Zone.

Invite your customers to dinner

Face it, customers will take whatever you can give them, and in two days, they'll be back for more.

Customers are the ravening hordes. They are the angry mob. Asking them what they want is like asking a six year old how much ice cream he wants. It seems obvious there is a limit to the amount of ice cream available, but a limit to how much he wants? Unthinkable.

Today's marketplace offers goods delivered from one end of the nation to the other overnight, overseas in a day and a half, and custom-made suits before dinner.

Keeping your customers no longer rests in their willingness to stay with you out of blind loyalty or through inertia. Consumers and business buyers are becoming more and more sophisticated and getting used to better and better service. People are expecting greater access to product information.

Fine, you're already publishing product details on your World-Wide Web site. They also want access to problem resolution. Fine, you have a knowledge base of product issues they can query. They also want access to the process of doing business. Your customers want to participate in decision making.

If your external Web site is up to snuff, you have the in-depth information in place already. But now it's time to cross the line. The winners of tomorrow will offer their customers access to applications and

See Amaze, *page 40*

Amaze, *continued from page 39*

databases previously considered "Internal Use Only." They will open the doors to the Communication Zone.

You know that great problem-reporting database you've been building? The one your customer service reps tap into to answer questions over the phone? It's time to clean it up and invite your customers to help create it.

Intersolv, Inc. (www.intersolv.com), a software development tools company, lets anybody who is interested review questions its customers have about using its products. It's a gutsy move.

Says Beth Martinko, director of North American customer support at Intersolv, "Even though this is an area rife for abuse by competitors, we felt it was better to be forthcoming than to sweep the dirt under the carpet. If users can look up problems and get the answers faster, and we can give the answers cheaper, it becomes a no-brainer."

Before Intersolv competitors rush over to view the 100,000-plus documents, Martinko is quick to point out the company has a password-protected area for customers who have purchased support. Those who have are given access to Intersolv's problem-reporting system. Customers enter trouble tickets and follow their progress through the problem-solving process. Is this an Internet application or an intranet application? The line is blurring.

Where's my order?

Customers know that you keep information about them in computers. They know that you are migrating this data to your intranet and, if allowed, their Web browsers can talk to your intranet. The expectation is that they should be able to access the network to track the information on them you've housed there. They want to get answers to questions like:

TRICKS OF THE TRADE

Some companies have mastered intranet use. For example:

- **Micro[illegible] time to market by [illegible]ating onlin[illegible]ussions on prod-[illegible]r development.**
- **Sun [illegible] team members' schedules [illegible]chr[illegible] via interactive calendar-[illegible]**
- **[illegible]l posts videotaped analysis of com-[illegible]e products within 24 hours of their announcements.**

- What was the last order I placed?
- Has it shipped yet?
- When will my order be delivered?
- When will my back-order be filled?
- Are there any alternative products I can get faster than what I've ordered?
- Who is my sales rep?
- How much have I ordered in the last six months?
- When will I hit the next discount level?
- How many frequent flier miles do I have?
- When will I need my next tune-up?
- When will my membership expire?
- What is my current credit agreement?

"What do you mean I can't find out on your Web site? What do you mean you haven't linked your Web site to your back-end corporate data center? I can get that information 24 hours a day, seven days a week from your competitor!"

Tomorrow, your marketing department will realize that your external Web site is merely the means whereby customers gain access to your intranet applications — the Communication Zone.

Will you be ready?

Sterne is author of World Wide Web Marketing. *He can be reached at www.targeting.com, jsterne@targeting.com, or (805) 965-3184.*

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DAY 2 SEMINAR:
SECURITY, CONNECTIVITY AND MANAGEMENT

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Intranets are not the latest buzzword or craze in the IT industry. They are real, already in place in more than one-fifth of all Fortune 500 companies and are transforming the way business and IT professionals think about information access, distribution and network infrastructures.

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7. Learn how Web servers work and how they can be extended
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10. Learn the direction of intranet-based groupware

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Intranets: Security, Connectivity & Management examines and analyzes the critical technologies you must understand to achieve intranet success. This information packed program builds on and adds to the topics of our highly successful Technologies, Tools & Strategies seminar offered on Day One of Intranets v'96.

In great technical depth, three core technology areas will be discussed and real solutions examined. Beginning with an analysis of the state of the marketplace — what is hot, what is important and what is going to affect your intranet. You will then delve into the technology areas with a focus on clear, detailed and understandable information.

In the security section you will explore the implications of intranet thinking with regard to defending your most valuable corporate asset: Information. Security will be examined from the perspective of firewall strategies and implementations, server security and information publishing security. The connectivity section will focus on the challenge of achieving maximum utility via the integration of legacy systems and existing corporate databases. We'll also discuss and examine the implications of internet mail standards on your intranet design. Concluding with management, the core tools of intranet development and management will be closely examined. We'll focus on the directions and the trends that will affect your intranet solutions.

Don't miss out on this high-demand program taught by world-renowned instructor Mark Gibbs. Invest a day at this seminar in planning your company's secure and cost-effective intranet.

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4. Learning about the leading and emerging intranet privacy technologies
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6. Seeing how legacy systems can be integrated with the intranet environment
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10. Understanding the direction of e-mail within intranet environments

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11/6/96	Chicago, IL	11/7/96
12/2/96	Washington, DC	12/3/96
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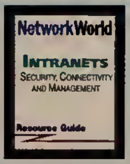

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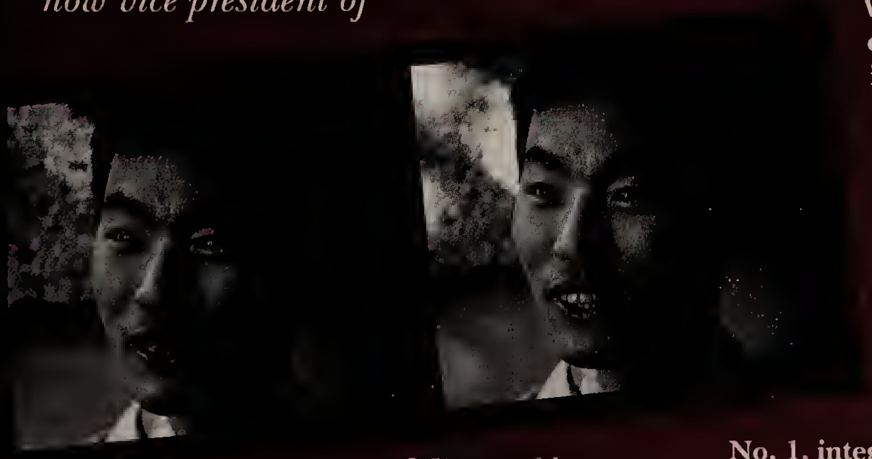
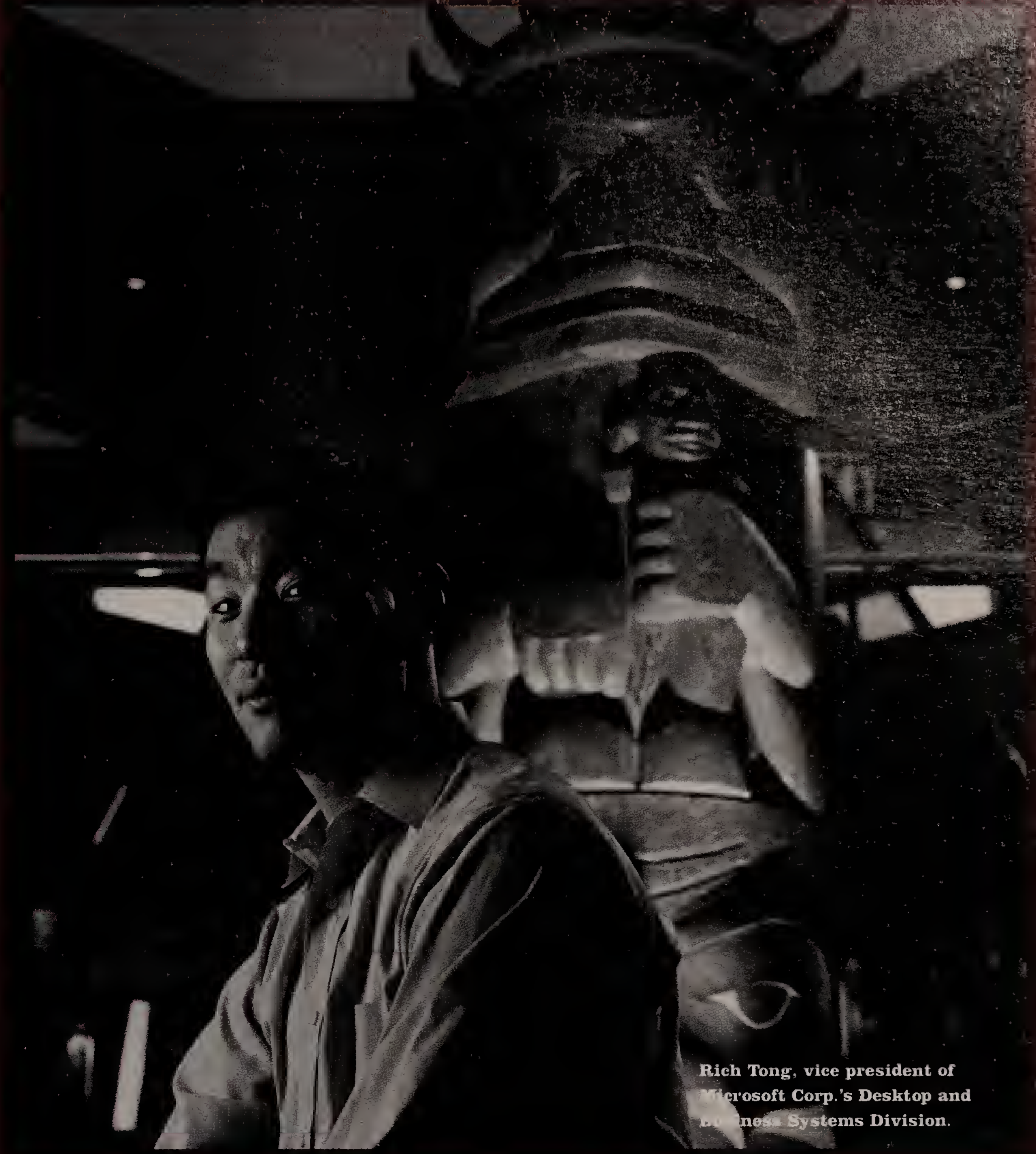
INTRAVIEW

Q&A

A sense of déjà vu

The brave new world of intranets raises a sense of déjà vu in Rich Tong. Client/server technology was going to change the face of corporate America a few years back, and Tong was part of the Microsoft Corp. team shaping and promoting the early Windows NT solutions that were among the company's early enterprise endeavors. Today, Microsoft mixes in Web technology, but Tong says the stock is the same: Windows NT. And he finds the Internet and intranet markets more tangible and promising than the often nebulous client/server architecture. Tong, who is now vice president of Microsoft's Desktop and Business Systems Division, recently shared his plans and visions with Senior Editor Peggy Watt.





Rich Tong, vice president of Microsoft Corp.'s Desktop and Business Systems Division.

JEFF CORWIN

Microsoft did a very public about-face on its development plans for the Internet last December. Was there a similar internal realization regarding intranets, or did you devise that strategy at about the same time?

I think the Internet stuff was a little bit different. Intranets, which people sometimes call corporate LANs, have been something we've been focused on for a long time. What we did, though, was focus on applications. We realized Internet technology could be used both externally and internally. But that requires you integrate a lot with existing technology and existing applications, as well. The Internet is all brand new stuff — it's all green field. With intranets, the situation is quite different, and it's much more of a challenge. And that's where a lot of our customers are looking to us to provide answers.

No. 1, integration is about Windows, on both the desktop and the server. Over the course of the next year, we'll be working to get to that next level of ease of use. Then, to integrate these Internet networking technologies, using the standard protocols, and provide easy development for client/server applications. And the third leg has to do with interoperability with existing systems, transactions, replication management.

What intranet-specific development is Microsoft doing in those areas?

We've spent a lot of energy on ease of use. We believe that the systems we think today are easy to use in about five to 10 years will be viewed as very quaint because the number of features, functions and things we'll have added is going to be just amazing. Therefore, we have to push harder on ease of use.

We have a project, code-named Viper, that will allow you to access CICS, Sequel, Oracle — all married together as though one system. The enterprise technologies we work on are much more about heterogeneity and multiple systems than they have been. You'll see much more integration. Like the Active Desktop, where the idea is the browser and the operating system aren't separate but totally integrated. Now, to make an analogous thing happen on the Web server side, we have this notion of an Active Server. The Web server won't be separate from the server operating system; it's just going to be part of it. And very fundamentally, it's not just about serving Web pages. It's about applications that are connected together, and that's what Viper is as a project.

See Déjà vu, *page 42*

Folks say, 'What I want behind the Web browser is a lot of different applications working together.' That's what Active Server is all about. ...So, if you want to change 401(k) information in one database, get that information to payroll for payroll deduction and log it all in the SQL Server, all this will be stitched together with Active script at the server level.

INTRAVIEW

Q&A

The more sophisticated IT people are worrying, 'When I have 500 Web servers, how do I administer them all?' A lot of people feel like they're at the top of the roller coaster looking down and, yes, the view is great but it's a bit scary. So, our No. 1 issue is convincing people that with Microsoft technology, you're not hurtling down at 100 miles per hour into catastrophe.

Déjà vu, *continued from page 41*

So Microsoft is wedding Web servers to Windows NT just as you are building the browser into the desktop operating system?

That's right. See, Web servers in their first generation were primarily about taking an HTML file and sending it to somebody. When we talk to our customers, they say, "Well, that's a small portion of what I want to do. In addition to doing that, I'd like to get to the point that I serve files but I can also run scripts, even if it's an order for something on the CICS system." That's Viper, and we should be seeing beta sometime this year.

And we have another project we're working at which is sometimes called a reliable message queue. Both these things are very important Internet and integrating technologies.

Many corporations have existing, disparate Web servers that pop up later strung together. How accommodating is Microsoft's enterprise view, especially since you're bundling your Web server with the Windows network operating system?

Well, there are two levels of integration. The first level is just for serving raw Web pages, right? And at that level, there's great interoperability.

The harder thing is when you have an Active Server. What do you do if you had, say, a Netscape server that wants to plug in to this whole system? And so there we are going to ask [Netscape Communications Corp.] to change a little bit and support OLE. So you can treat that other server as an object. Long term, this is more valuable. In fact, the way our transactions coordinator works is it thinks it's talking to a lot of OLE objects. So it treats the SQL Server and the Oracle system and the CICS system like OLE objects.

TONG ONLINE

For the full text of this Q&A, go to Network World Fusion. Key the number at right into the DocFinder box on the home page.

FIND IT ON FUSION 2102

http://www.nwfusion.com

I certainly hope that when customers look at us, they see we have a very comprehensive product line, but also very easy-to-integrate other components.

So how have intranets penetrated Microsoft? Does nearly every Microsoft employee have a Web server or at least a home page?

I wouldn't say nearly everybody, but it's getting to be very high. Basically, now people are embarrassed when they don't have one. I've had a Web server for my workgroup for more than a year now.

Do you find intranets are an easy sell?

I think it's almost the same bleeding-edge group of IS people who just go to the next thing. And I think all of them have leaped. The question is, 'How do we persuade the rest, the 80%, that this is the right approach?'

Well, in some ways, this is a continuation of LANs. There was client/server and now this, so we're making everything better gradually, and we have to convince them. It's got a lot of the things they ask for. You know, five or six years ago, you would be very hard pressed to find any company that would say, 'Hey, we got it to do all these things simultaneously.' And I think that's just the thing that we were missing in this industry: a comprehensive approach.

What are the other main points you think convince people to deploy intranets?

Ease of administration, integration, development, the writing of applications and integration of old ones. Not everyone is going to rewrite all their accounting applications in Java. We want to be part of that Java wave, and yet, at the same time, we take the enterprise point of view and say it's one of the languages you'll be supporting.

Another point is the approach we take to the end-user experience. You know, today everyone says Web browsers are easy and all that other stuff. But the fact is you have to learn some new stuff to use them. We want to make it even easier.

All the good ideas in the browsers will appear in the apps and in the operating system. And similarly, all the good ideas in the apps and in the operating system will appear in the browser.

Where does Java fit into this model of object orientation?

Well, first of all, when I say Active Scripting, part of the Active Desktop, this actually includes either Java, JavaScript or Visual Basic. Basically, there are two different types of things to do. Scripting is really gluing things together. And so our Active Scripting technology largely is language-independent — you just plug it in. And the other place is where one of the objects is the transactions coordinator, and it actually talks to Java.

This leads back to the question about components. Is Microsoft planning to supply all or most of the components of an intranet for a corporation?

Well, "all" is a big word. I certainly hope customers see we have a very comprehensive product line, No. 1. No. 2, I hope they see that that product line is very integrated, and that the products work together very well. And No. 3, in terms of integrating other components, it's very easy to do that.

And when will we see a proxy server as part of that selection?

As for the proxy server, that product should ship this year.

And like all the products in our Back Office product line, the product is going to use NT security. So when you want to go out [of the intranet], it will be checking against the NT database for permissions and access rights. Those are the kinds of things customers are telling us offer huge benefits in integration. And it also means all the Windows NT management tools work. You can monitor, you can audit, you can track and so forth, with the familiar Back Office tools.

Bill Gates says Microsoft expects the intranet market to be much larger than the Internet market. Can you elaborate?

This is because collaboration and coordination is incredibly important inside corporations. People are willing to spend an amazing amount of money to make accessing information very easy, make collaboration seamless and to make the management of all the information in the company simple. And this is all driven by Internet technology, which is a standardization of protocols.

Although the intranet and Internet use the same technology, how do you contrast the markets?

I'll use a nautical example. The Internet is a sea change. It's as important as WYSIWYG and the graphical user interface. That was a new phase and a change and basically a common way to access applications.

I think that part of the reason that I'm very excited about the Internet technologies is, in essence, in the intranet it makes quickly what used to be a revolutionary change, like in the way you structure your applications from CICS, COBOL, to client/server.

There's a very, very strong déjà vu with intranets and client/server.

If you were to give this a product name, it'd be called Client/Server 3.0. Where LANs were the first venture, then we finally understood the need for Visual Basic and the development process and all that, and then to application servers. And now we understand this. ■

GIACOMO MARCHESI

The LEGACY TANGO

BY DANIEL DERN

Teaching your intranet to dance with the old standbys.

If mainframes are stodgy, dyed-in-the-wool and typically pinstriped, intranets are best thought of as chatty, irrepressible and anxious to get things done.

Sooner or later, though, you are going to want to get these two to tango. After all, those legacy systems house rich resources that will ultimately prove valuable to intranet surfers.

MIS groups exploring the question of how to bridge the environments often find new, valuable uses for legacy resources and quicker, more effective ways to bring up new legacy-based applications.

It is no longer a question of whether you can make legacy systems available to Web browser users, it is simply a question of which tools to use. With the range of options available today, it is possible to make any legacy system browser-accessible.

Screen test

The first and simplest way to give browser users access to legacy systems are screen scrapers — programs that enable a Web browser to emulate terminals of legacy environments, directly or through a Web server.

Programs that do this include I/Net, Inc.'s (www.inetmi.com) Webulator/400, a 5450 terminal emulator that converts AS/400 application screens to HTML, and IBM's CICS-WWW gateway.

Using a program such as Webulator/400, users can access legacy information and applications such as accounts receivable, inventory and order status, written in languages such as COBOL, ILEC, RPG, DDS and C.

Screen scrapers are simple but sometimes inadequate. The translator may not emulate screen elements such as tables properly and may not be sufficiently secure.

Instead of enabling browsers to talk directly to legacy systems, the next option is to use a Web server intermediary. Here, you have two options, says Rob Rowe, executive vice president of consulting services at BR Blackmar & Associates in Dallas. You could turn the existing server into a Web server or connect it to a separate intranet Web server, such as a box running Unix or Windows NT.

Using a program like Wbulator/400 users can access legacy information and applications such as accounts receivable, invetory and order status.

"You can turn any box into a Web server," says Frank Dzubeck, president of Communications Network Architects, Inc. in Washington, D.C. "HP, IBM, Digital — they all have service offerings to assist customers in implementing Web servers on their equipment."

Web server offerings for legacy users include: IBM's OS/390 Internet BonusPak for MVS and OS/390 users; Webshare, a freeware server for VM systems (see IBM's VM home page at http://vmdev.gpl.ibm.com for examples of VM-based Web servers); and I/Net's WebServer/400 and its new Secure Commerce WebServer.

In addition, freeware and shareware HTTP Web server programs written in C or PERL can be obtained and recompiled on your legacy platform, or you can even write your own Web server program.

Many organizations have elected to install and run Web servers directly on their legacy systems. Stephen Wallace, president of Pacific Brokerage Services in Los Angeles, passed on that option at first. "We had a single-processor AS/400 but didn't consider using it as our Web server," he says. Wallace spent $3,000 for a PC running Windows NT and also purchased a copy of Netscape Communications Corp.'s Commerce Server.

But, while looking for other information on the Internet, he ran into I/Net's site. "We ended up buying their Web server, and it took us about two hours to install on our AS/400. We're providing dynamic content using RPG and C. We're getting about 40,000 to 50,000 hits daily from our customers, and each gets a unique response," he says.

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Legacy, *continued from page 43*

Wallace is happy with the results. "It's fast, and we never have any downtime. We do have security concerns, which we expect I/Net's new commerce server will handle," Wallace says.

The right place

Although Web server software is available to convert most of today's legacy hardware into Web servers, "it's important to evaluate whether that's the right approach," observes Michael Goulde, senior consultant at Patricia Seybold Group, Inc. in Boston. "Legacy systems are expensive. It's going to be a lot cheaper to add a PC-based server to handle the additional load rather than add another processor to the mainframe."

Zach Kessin, a contract Web developer, says the best Web server software runs on Unix, OS/2 and NT. "Running the Web server on a separate platform simplifies distributing the processing load and will make it easier to migrate the legacy system when and if you want to," he adds.

Adding Web serving to your legacy system is fairly costly according to Rowe. "It involves getting TCP/IP running, and most legacy-type servers aren't tuned for it, so you're creating about the most expensive possible Intranet server." Even IBM tends to front-end its AS/400s with RS/6000 Web servers, he notes.

"The widest range of Web development tools are available for PC environments," Goulde points out. "You'll have to write the queries that go from the Web server to the legacy system or implement the screen scrapers no matter where you put the actual Web server. With today's tools, any data I can get to via ODBC [Microsoft Corp.'s Open Database Connectivity architecture] I can access equally well from a Web server."

Using a separate system for the Web server offers other advantages, Rowe says. "All the HTML, security, firewall and other intranet/Internet functions are on the Web server. This isolates the functionality, letting each server do what it does best. It's also more manageable and provides better security — you've got a dedicated server for the intranet activity, and the legacy server is only handling data.

With today's tools, any data I can get to via ODBC I can access equally well from a Web server.

—Michael Goulde, senior consultant at Patricia Seybold Group

"Plus, most of today's Web management, testing and administration tools run on NT or Unix, not in legacy environments, which means that products — and staff — are more expensive if a company chooses to work within its legacy framework," Rowe says.

From the security perspective, Goulde adds, "Frankly, I'd be concerned about having [Common Gateway Interface] scripts running on the same machine where my legacy data was stored. Bad CGI programming can destroy data and even directories."

"Legacy systems tend to be corporate assets, and most corporations don't understand security well enough to be 100% sure they're keeping unwanted users from stealing or corrupting data," Rowe says. "Within our test group, with only a basic knowledge of IP, Unix and NT, we find we're able to break into about 90% of systems we test. None of our customers are willing to take that kind of risk by making their information available via intranet or Internet access."

Webbing legacy apps

Whether your new Web server is on the legacy system or not, the task of getting the two to talk together still remains.

This means using CGI scripts or other tools to turn browser input into queries to legacy systems and inserting HTML formatting codes into query results, turning them into Web pages for delivery to browsers.

In theory, CGI scripts can be created "by hand" — that is, handwriting the code — or taken/modified from online and CD-ROM libraries. However, in practice, this is not likely to be sufficient for building scripts to access legacy systems.

But relatively inexpensive scripting tools such as BlueStone Inc.'s Sapphire/Web and Information Builders, Inc.'s PowerBuilder can be used as front ends, providing a way to create HTML pages and CGI-bin scripts to work with legacy applications and popular databases from companies such as Oracle Corp., Sybase, Inc. and Informix Software, Inc.

One advantage of this approach is that the Web-based applications can access any number of Web, database and legacy systems.

At the high end are the more sophisticated application development environments such as: WebObjects from NeXT Software, Inc. in Redwood City, Calif. (www.next.com), which is used by companies such as Dell Computer Corp., Sharper Image Corp., Fannie Mae, Merril Lynch & Company, Inc. and Motorola, Inc.; Visual Wave from ParcPlace Digitalk in Sunnyvale, Calif. (www.parcplace.com), whose users include Dun & Bradstreet, Federal Express Corp. and other Fortune 1000 and Global 2000 companies in the financial, health care and public utility sectors; and IBM's Visual Age.

The applications created using these tools, which can run on separate servers, sit between users' Web browsers and servers on the corporate network, be they legacy systems, Web servers or anything else ranging from Internet services to real-time data feeds.

These tools offer fast application development and typically can talk to a wide range of back-end systems and other existing application environments through APIs, including the Internet Server API (ISAPI), the Netscape Server API (NSAPI), and Web programming interfaces such as CGI.

Dell's new online purchasing system, for example, which lets Dell sales staff as well as Web users configure and price a purchase, was done using NeXT's WebObjects. "All the data was already in a relational database," says John Landwehr, product marketing manager for WebObjects at NeXT. "WebObjects provides the interface between the user interface and the database queries/responses."

WebObjects also simplified and sped development of an intranet/legacy application at Sharper Image, Landwehr claims. "All the data was already in their database. Using WebObjects, Sharper Image's staff was able to crank out three online applications, including the `Catalog Showroom,' and a custom gift finder catalog," he says. The latter creates a custom selection from the catalog based on user keywords to help customers pick a gift from the relevant subset of Sharper Image's total offerings.

"Instead of building HTML by hand, they created WebObjects applications that did queries and returned the results as on-the-fly HTML pages. They were able to reuse much of the program components, which means things got done much faster and less expensively," Landwehr says.

WHO ISN'T DANCING?

Information about corporate plans to integrate intranet and legacy environments is scarce, but you can extrapolate conclusions from some Internet data.

A 1995 survey of 189 companies by International Data Corp. called "Behind the firewall: A look inside the corporate internet" found that **61%** of the companies had linked internal systmes to the Internet. Of those. 68% said they were providing access to databases, **54%** said they were providing application access, and **41%** said they were processing transactions.

The survey revealed that **71%** of the companies planned to connect internal systems to the Internet this year. Given the technologies to connect these systems to an intranet, it isn't too much of a rach to conclude that a similar percentage of companies are already integrating intranet/legacy environments today.

"In a large company, the business isn't being run by just one data source, so you need applications that can tie it all together. Putting a Web server on each piece won't do it."

Kelly Looney, product marketing manager for Visual Wave at ParcPlace DigiTalk, says the Visual Wave product offers an object-oriented development environment through which Web browsers and Web servers can connect to systems with "front-line business responsibilities."

This means providing the ability to interface to a range of platforms, databases and environments, such as DB2, Sybase, Oracle and Informix, as well as C-type interfaces, socket connections and systems from IBM, Tandem Computers, Inc. and other vendors. "Visual Wave lets MIS treat Web browsers and servers as just another platform in terms of the types of clients and servers they're handling," Looney says.

Strategy reflects requirements

It is clear that one way or another any application on any legacy platform can be made accessible to Web browsers. The choice of solution depends on the usual factors.

"You need to know what you want to do," Dzubeck says. "You want to match your capacity to the demand you expect.

"It's the content that's important, not the platform," he says. "Nowadays, you can put a Web server onto any system that has content, which is important. Don't re-port content. If you have an investment in equipment, knowledgeable people serving it, etc., don't port that to something new. But if the platform the content resides on can't accommodate the new demands, then move it."

Don't forget to keep the future in mind, adds NeXT's Landwehr. "Because of the tremendous rate of change — technology for the Web has undergone 50% change within the past six months alone — when you commit to any one technology, you need to know how portable it will be and how will it grow. For example, HTML keeps changing, so you need a technology that can change with it, such as adding support for frames. Pick tools that will keep up with Web technology for you." ⊜

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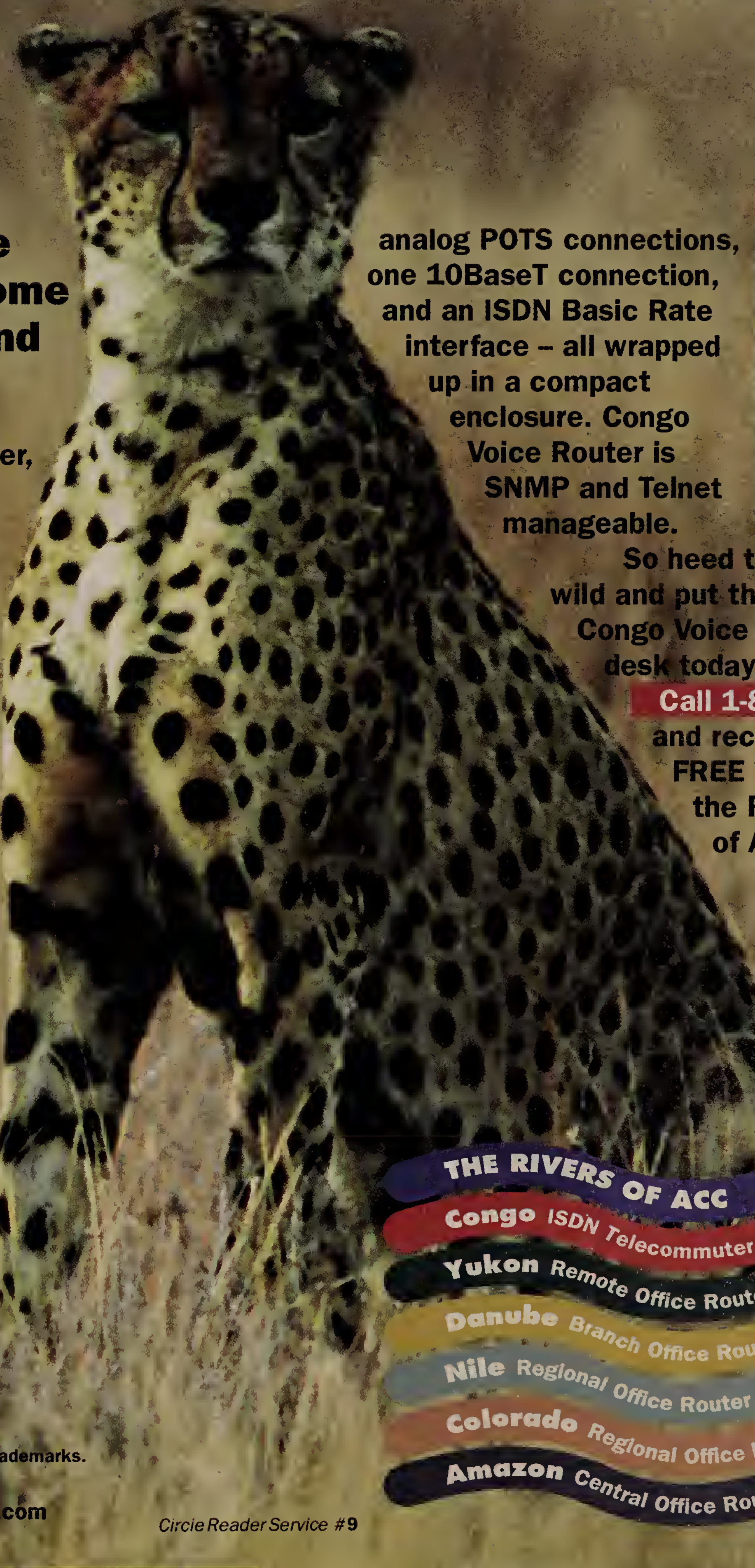

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Circle Reader Service #9

Safe and Sound?

JOEL NAKAMURA

When you start to feel that way, the time has come to reassess your defenses.

BY BETH SCHULTZ

Certain it had established adequate intranet security mechanisms, a manufacturing company recently asked a team of information protection consultants at WheelGroup Corp. to act like disgruntled employees. It wanted to be doubly sure users with valid accounts could not access restricted servers.

Within minutes of receiving a user name and password, the security team had bypassed the security controls, broken into the engineering department's server and downloaded a blueprint for a next-generation product the client had spent $2 million developing.

The client wasn't phased, says Toney Jennings, president of WheelGroup. The IT manager thought the technology-savvy engineers had simply left a trap door open when customizing the server. "You'll never get into accounting," he said.

A few minutes later he watched in horror as the WheelGroup team downloaded a performance report and the salary history of a company vice president.

Scenarios like this are by no means restricted to internal security breaches. Jennings tells of another client who asked WheelGroup to try penetrating the intranet security barrier it placed on its Internet connection.

"IT did a great job of securing that one Internet connection," Jennings says. "But it didn't realize that marketing and other groups had gotten their own connections — 14 in all!" From its operations center in San Antonio, Texas, WheelGroup infiltrated the intranet and downloaded strategic plans and product designs.

"We usually find that company computers are so darn open, breaking in is as easy as putting a hot knife through butter," Jennings says.

Other security experts agree, and they worry that intranets will exacerbate the situation. It's hard enough to secure computers known to be attached to a corporate networks; what happens when a dozen or so Web servers have been put up without IT's knowledge?

The implications associated with the deployment of unsanctioned Web servers are significant, says Gregg Deane, senior manager of Ernst & Young LLP's Lake Michigan Information Security Services practice based in Chicago. "That PC turned server is often attached to the wide-area network but not physically segregated. It's a potential entry point to sensitive corporate information."

Unofficial, and so unprotected, Web servers are among the most obvious security risks associated with intranets. But even sanctioned, IT-installed servers and other intranet-related hardware and software can introduce vulnerabilities.

"IT managers might inadvertently leave loopholes open when they set up a firewall's routing table or when they make applications HTML-aware or when they set up the [Secure Sockets Layer] on the servers," says Richard Kosinski, president of NeTegrity, Inc., a security firm in Waltham, Mass.

It's ironic that firewalls, the very devices meant to secure internal Webs, often prove vulnerable. This happens because IT managers make so many access allowances that the brick walls end up looking more like Swiss cheese, Jennings says.

Such was the case at another WheelGroup client — a Fortune 500 company that asked the firm to test if the firewall was enforcing the policy it was supposed to be.

"In this case, the firewall was letting in everything. It was not filtering any traffic," Jennings says. "People got to mucking around with the firewall so much that it basically turned out to be just a workstation acting as a router."

This scenario is all too common, says Stephen Cobb, director of special projects at the National Computer Security Association (NCSA).

If 5,000 browser-enabled employees decide they need to be able to run audio clips off the Internet, Cobb says, they can pressure IT to open a port on the firewall. IT, however, may not have had a chance to thoroughly test the audio application for security weaknesses.

"There's direct pressure to liberalize the firewall for technology before that technology has really been tested," Cobb explains.

When it comes to intranets, firewalls are the staple security technology — hence, many companies define an intranet as the portion of their network behind a firewall. That view may be rather limited and simplistic, but it points out the trust companies place in the technology.

SECURITY OUTTAKES

Information protection specialists agree a heightened sense of security awareness has accompanied the dramatic growth of intranets and the Internet but feel there's plenty of room for improvement. Here's what a few experts say about the state of information security today.

"A lot of companies still have a lot to learn about data, PC and LAN security before they move on to scarier stuff like intranets."

Stephen Cobb, director of special projects at the National Computer Security Association in Carlisle, Pa.

BRITT RUNION

"Information security can be greatly improved. There's a pretty wide gap between the risks most American corporations have within their networks and the measures they've deployed and are using to reduce those risks."

—Richard Kosinski, president of NeTegrity, Inc., a security firm in Waltham, Mass.

SHAWN HENRY

"Security today is more reactive than proactive. Technologies, like Web servers and browsers, are being deployed in many places faster than the ability of the infrastructure to keep up."

—Gregg Deane, senior manager at Ernst & Young LLP's Lake Michigan Information Security Services practice in Chicago.

DAVID B SUTTON

"The technology du jour in intranet security is the firewall," says William Ruh, executive vice president of Concept Five Technologies, an intranet and electronic commerce consultancy in McLean, Va.

Cordoning off Web servers

Intranet builders install firewalls on the corporate Web's perimeter and limit entry to remote clients with appropriate names and passwords.

Firewalls are available with a range of capabilities from a variety of vendors, including Digital Equipment Corp. and IBM as well as smaller players such as

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Security, *continued from page 47*

CheckPoint Software Technologies, Ltd., Milkyway Networks Corp. and ON Technology Corp.

First-generation firewalls, also known as packet-filter routers, simply examine the source and destination addresses of inbound TCP/IP packets. They check the packets against a list of "friendly" addresses, and allow or reject entry to the network as appropriate.

These firewalls act more as a deterrent than a security stronghold. Hackers can easily substitute friendly addresses — a process called spoofing — and gain access to the intranet.

Second-generation firewalls, commonly known as proxy servers, are meant to address that problem. Proxy servers capable of filtering packets at the application level are particularly important for securing intranets.

As a proxy for a Web server, these application-layer firewalls have the authority to communicate with the system requesting access. Besides verifying the validity of user names and passwords, these products examine the data being transmitted, not just the packet header. An HTML proxy, for instance, knows what valid HTML data looks like and can determine if access should be provided.

Vendors such as CheckPoint and ON Technology have developed third-generation firewalls that use the Stateful Multi-Layer Technique (SMLT) for screening packets. Rather than examining packets using a proxy, SMLT-based firewalls use data-parsing software that takes a snapshot of the entire packet. These firewalls quickly compare packets to known states of friendly packets, a technique that saves on the processing time that can bog down proxy-server firewalls.

Increasingly, IT managers are using firewalls like these to cordon off corners of intranets. "A lot of companies would prefer to not have human resources or key accounting functions visible to everyone in the company," says Jay Batson, vice president of ON Technology in Cambridge, Mass. Firewalls provide the answer.

"The ability to segment systems is one capability any information security person should have in his bag of tricks," says Concept Five's Ruh.

J.P. Morgan & Co., Inc., thinks so, too. At the New York-based global financial services firm, an information security services team helps business managers assess risk issues associated with data they want to put on the internal Web. If the information is meant for the eyes of only a portion of the company population, the security team might recommend the information be hosted on a private Web rather than the corporate intranet, says Fred Pinto, director of information security services at J.P. Morgan/The Pinnacle Alliance.

"We'll use the firewall to segment the Web server," Pinto explains.

Whether you're buying a firewall to restrict external access or segment an intranet, make sure it's one that you can understand and configure, ON Technology's Batson recommends. "The No. 1 problem with firewalls is misconfiguration, so make sure you buy one that's drop-dead simple for what you have to do," he says.

The NCSA, a multitiered information security group in Carlisle, Pa., encourages companies to frequently test their network firewalls to make sure there are no vulnerabilities.

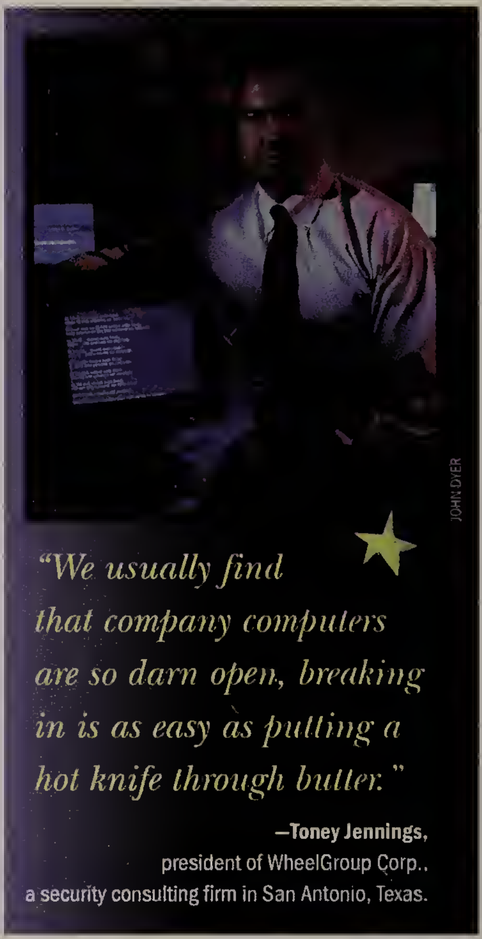
"Firewall technology is very good, but it is hard to configure. If a firewall is installed incorrectly or is imperfectly managed, then some of the holes meant to be plugged aren't going to be," says the NCSA's Cobb. Hackers can exploit four or five bugs in the Unix Sendmail program alone if a firewall isn't properly configured, he adds.

Test and test again

Intranet administrators can use outsiders to test their firewalls or do it themselves using commercial software from vendors such as Internet Security Systems (ISS).

ISS recently enhanced its line of security assessment tools with intranet-specific products: the Web Security Scanner, which runs vulnerability checks of the operating system running beneath a Web server; the Firewall Scanner, which tests the configurations of firewall applications and the operating system on which the firewall runs; and the Intranet Scanner, which scans every device on an intranet and reports back with a list of services running on each machine and a prioritized list of security vulnerabilities.

"We find, on average, 18 high-risk vulnerabilities per network device, including printers, routers, firewalls and Unix boxes," says Tom Noonan, president of Atlanta-based ISS. "This is a huge problem: Large companies can have tens of thousands of such devices on an intranet."



JOHN DYER

"We usually find that company computers are so darn open, breaking in is as easy as putting a hot knife through butter."

—Toney Jennings,
president of WheelGroup Corp.,
a security consulting firm in San Antonio, Texas.

Because intranets run TCP/IP, they can be more difficult to secure than other corporate networks, Noonan contends. "The open communications and ease of sharing information supported by TCP/IP is directly counter to security and minimizing access to the intranet," Noonan says. "The two are at opposite ends of the spectrum, which is what makes security on the intranet so difficult."

Lockheed Martin Corp. appreciates that truism. The challenge of building an intranet and providing ubiquitous access to information has required the company to shift from the mainframe mindset of protecting everything to the open Unix philosophy. That's hard for a company working in the defense industry, says Lynda McGhie, manager of information security at Lockheed's Enterprise Information Systems division in Orlando, Fla.

McGhie compares the move to an intranet environment to letting the chicks out of the henhouse. "You lose control and accountability."

So when it comes to security, she says, "we use everything you can imagine." To protect the data allowed on its intranet, Lockheed uses secure Web servers, public and private keys, smart cards, encryption, and internal and external firewalls.

The company will soon add encrypted tunneling to the mix, which allows remote connectivity to the intranet over a secure Internet link.

The company does not allow the use of JavaScript on the intranet because of security problems found in the programming language, McGhie says. "We don't need Java today, but we will soon, so we're hoping that vendors cooperate,

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OF SECURITY POLICIES AND INTRANETS

If you aren't ready to write and enforce Web-specific security policies, then you're not ready to roll out an intranet, or so says Stephen Cobb, director of special projects at the National Computer Security Association (NCSA).

"I'm a big believer in security policies. Unless you have a policy in place, you're dead in the water," says Cobb, adding that a formal policy shows a company has thought through security issues and is ready to address them as they arise.

Even if a company already has a security policy in place, it more than likely will need to revamp it to accommodate the intranet and the wide-scale connectivity it enables, Cobb maintains.

"We changed our security policy because of the intranet and the impact of the open and distributed nature of the network," says Lynda McGhie, manager of information security at Lockheed Martin Corp.'s Enterprise Information Systems division in Orlando, Fla.

In its security policy, Lockheed defines categories of data and provides guidelines for protecting the information, McGhie says.

Chicago-based Amoco Corp. supplements its information security policy with new procedures and guidelines each time a new technology comes along, says David Burns, senior staff security analyst at the petrochemical company. For the intranet, Amoco established an oversight committee that keeps its eye out for information that shouldn't be available to everyone in the company.

"In the rush to develop the intranet and the information sharing that's implicit there, sometimes people go a bit overboard. So we've established some checks and balances," Burns says. "The charter of the group is to grow the intranet in a rational manner."

The NCSA's Cobb has a few recommendations for what an intranet security policy should include. Employees posting information on the intranet, for example, should understand they are responsible for checking the information to make sure it doesn't contain malicious code, applets or viruses. In addition, employees need to know they will be held accountable if they publish — purposefully or not — confidential information on the Web.

"Companies have to make sure that the reasons for policies are clearly stated: Information is vital to the survival of the company and, consequently, your job," Cobb says.

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NW

Security, *continued from page 48*

plug the holes and make the environment secure in a timely fashion."

Amoco Corp. has made a similar decision. "We currently are blocking the importation of Java applets to the intranet, but people can develop their own scripts," says David Burns, senior staff security analyst for the huge Chicago-based petrochemical concern company. "Importing a Java applet from an arbitrary site on the Web has the potential to introduce Trojan horse type of dangers," Burns says.

> *"The open communications and ease of sharing information supported by TCP/IP is directly counter to security and minimizing access [to the intranet]. The two are at opposite ends of the spectrum."*
>
> **–Tom Noonan,**
> president of Internet Security Systems

The Java weaknesses represent just one example of problems associated with emerging Web technologies, security experts say.

The NCSA's Cobb points to potential dangers related to the caching of data by Web browsers. The typical browser caches 5M to 10M bytes of the most recently accessed data on the computer's hard drive. Microsoft Corp.'s Internet Explorer, for example, reserves about 10% of the hard drive for the cache. On a 1G-byte drive, that's 100M bytes of potentially sensitive data waiting to be scooped up by an unscrupulous employee.

"You have to configure the server so pages aren't cached, not allow browsers to cache, or lock up the machines," Cobb says.

Even the so-called secure intranet technologies are potentially vulnerable. Anker Berg-Sonne, chief technology officer and vice president of engineering for WebMate Technologies, Inc., points to what he considers major shortcomings of the standard HTTP-Secure (HTTP-S) authentication and access control scheme used by Web servers. To end an authenticated sessions, users must shut down the browser — something not routinely done.

Since there's no easy way to log out, people leave sessions open. Their user names and passwords, plus all the associated privileges, get attached to a session and communicated with each request from the point of logon, Berg-Sonne explains.

WebMate, an Internet/intranet company based in Canton, Mass., addresses this problem in its WebMate/Foundation application development tool and server-based platform. With the Foundation product, intranet managers can specify different access requirements down to the record level in database tables. They also can write access control lists that protect data by user name/password, IP address, day of the week, time of the day, or custom schemes.

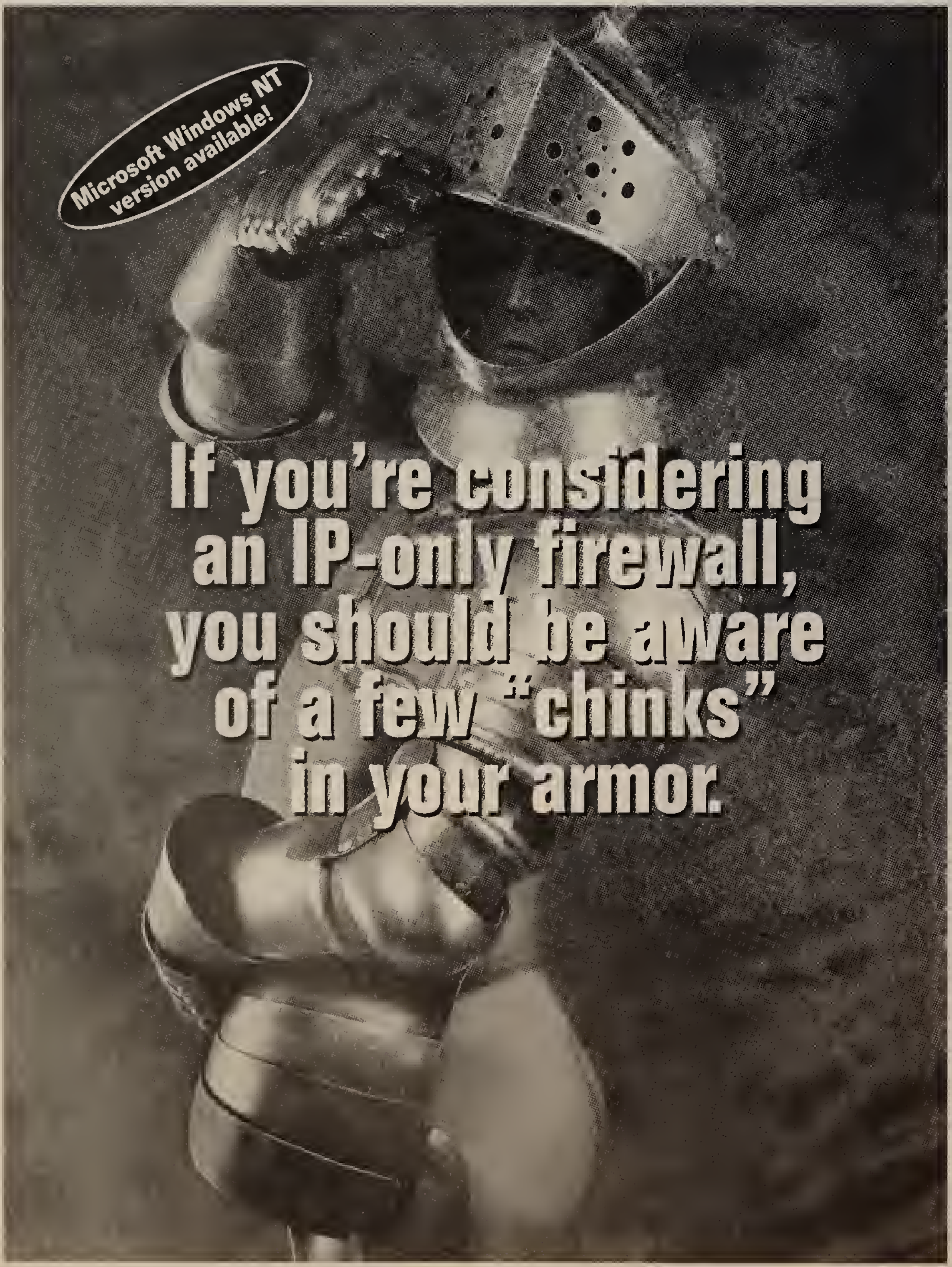
The access control lists essentially create a security hierarchy for the intranet. An intranet manager, for example, can decide from what IP addresses a database record can be accessed. "You can say that this data can only be accessed with browsers in this domain at this time of day. That means employees can't download data from home," Berg-Sonne says.

Piece by piece

Other security firms also are trying to granularize control over authorization. NeTegrity, for instance, earlier this October debuted the SiteMinder Enterprise Security Manager, which enables access control down to the most minute detail in an application.

With SiteMinder, intranet managers can apply access controls to applications, files, databases, records, fields, transactions, accounts, HTML resources and menus, NeTegrity's Kosinski says. What's more, administrators can centrally manage the rights to network resources.

"The idea is that customers end up with a system that will enable them to deploy intranets safely. They will know who the users are using anyone's authentication scheme and know down to the application and field level what they can access," Kosinski says.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Beyond access controls, WebMate provides an SQL extension that makes database access safer, too. "We think it's essential that the Web environment has one authentication system and the corporate relational database a completely different one," Berg-Sonne says.

With this product, users enter their basic name and password when accessing the intranet. Rather than duplicating that same authentication scheme, the Web application checks its database for user IDs and presents them to the relational database.

Intranet-specific user names and passwords never pass over the link between the Web server and the database, he says.

As the Java and HTTP-S problems illustrate, intranets introduce elements of risk. But they also hold up the mirror to the generally poor state of network security, the NCSA's Cobb says.

The rise of intranets, particularly those that integrate with legacy systems, raise the bar on security, Cobb says. "Since the intranet leverages existing network technology, companies will finally have to face up to their security flaws."

TECHNOLOGY OPTIONS

So you've turned on your basic access scheme and set up your firewalls, but you realize some applications warrant additional security measures.

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Digital certificates. This technology, also known as public-key certificates, can be used to identify users. Often compared to a driver's license, digital certificates typically contain identifiers such as the certificate owner's name and public key, the issuing organization's identification and digital signature, and the certificate's validity dates. They are based on the International Telecommunication Union's X.509 certificate standard.

Web servers can be configured to grant access only to people with certain certificates. Web browsers can be set up to trust servers that present particular certificates.

Encrypted tunneling. Tunneling software encrypts IP packets, encapsulates them within a TCP/IP packet and then forwards the scrambled data over the Internet. Tunneling software at the receiving end decrypts the data and forwards it to its destination within the intranet.

Face and finger images. For ultrasensitive information, a few companies have entered with products that use fingerprints and face images to grant access to information.

Public-key cryptography. A pair of public and private keys are used to encrypt and decrypt information (public keys are published, and private keys are kept secret). Information encrypted with one key, the public key, can only be deciphered using the matching private key.

Smart cards. These credit card-like devices, also referred to as token cards, generate and store key pairs and digital certificates.

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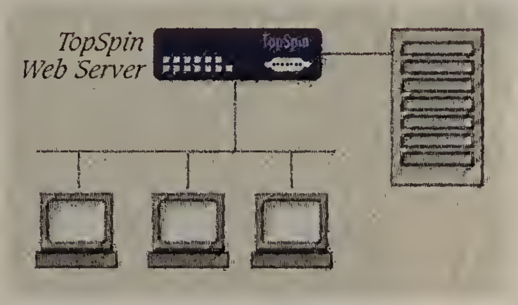

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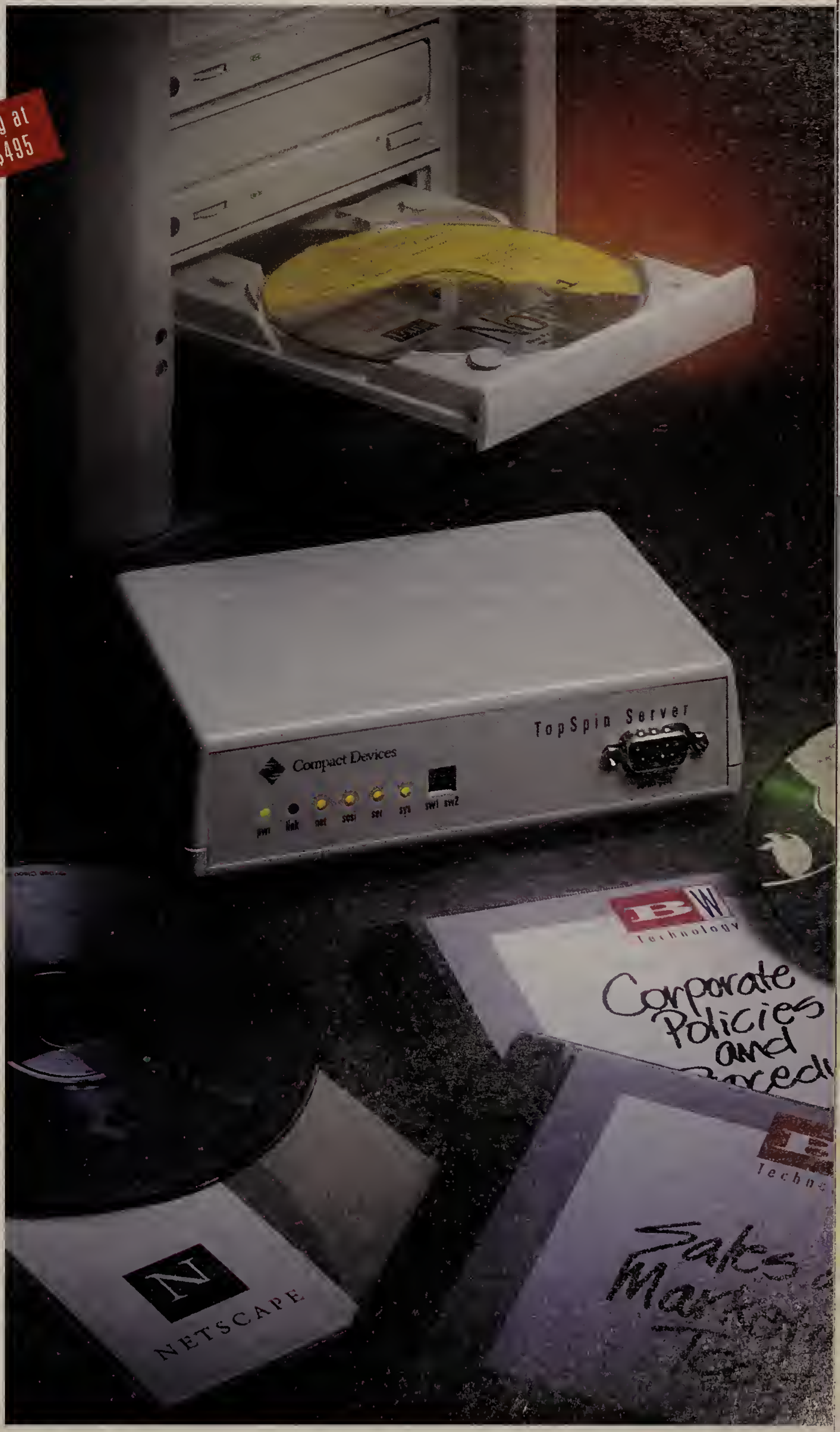

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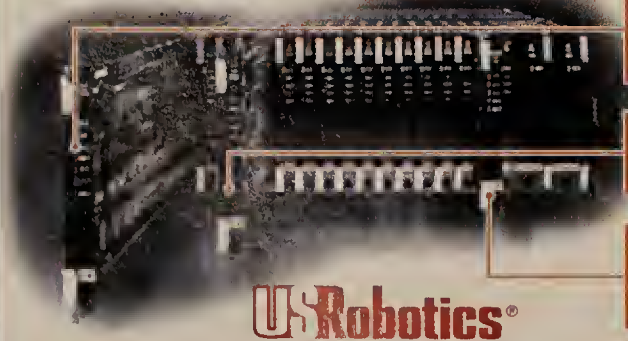

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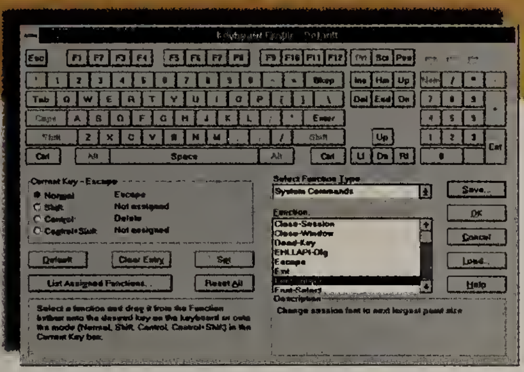

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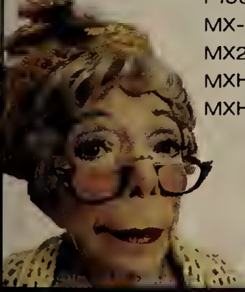

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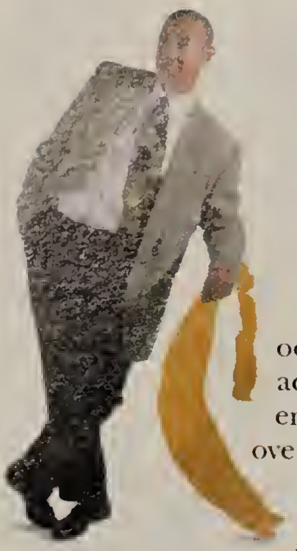

Hip, Happenin' Cool Intranets

Cool. You're hip, you're slick, and if it wasn't for an accident of fate that drove you toward the computer business, your hipness would be plastered all over fashion spreads in *GQ* or *Vanity Fair*. Right?

And when it comes to technology, you're so hip you're going to build an intranet. Excellent! Give me a virtual high five.

You've investigated Web servers, decided on your development tools and are ready to go. But before you really get started, I want to discuss two areas to ensure that you are, in reality, as cool as you think.

The first is looks. Not yours, you narcissistic devil, you. The looks of your intranet. You may be tempted to stay loose. You might think that you'll get the whole thing started and then add some gloss later.

Don't do it!

JOEL NAKAMURA

If you don't get a strong graphical style and some kind of document layout rules established early on, you sure won't be able to do so later. Oh, right, you could try to Genghis Khan-it: sweep down out of the IT group into the realms of barbarian departments and, with some persuasion from the torch and sword, make them tidy up their documents.

That might actually work if each department had, say, 100 or 200 documents. The problem is, if your intranet is the success you hope it will be, a department could easily have 1,000 or 2,000 documents in next to no time.

Let's see you make it tow the party line, then.

The first thing you need to do, my hip friend, is sort out graphics and design. As I've previously discussed in this space, you should be trying to create a new information publishing environment. Your goal should be to make it possible for staff members to capture, mine and use corporate intelligence through the intranet as fluidly and easily as possible.

Part of what will encourage intranet use will be its look and feel. If it looks like data — dry, techie and boring — users will probably not relate to it. On the other hand, if your intranet is slick, looks good, is well-organized and appeals to their idea of what's fun and easy to use, they'll care about it. Users will want to work with and add their own stuff to this amazingly cool environment.

As for the use of templates, be careful. For the top levels, by all means, create templates that are quite rigid. After all, this is where the tone is set. But as you move from corporate to individual publishing, relax the formats.

If staff members want to add a plain text file without any special formatting and without links to the rest of the intranet, let them — it will still be findable through your search engine. And if the document turns out to be valuable, then you can migrate it to a higher, more corporate level. But using a hierarchy of templates achieves the objective of encouraging staff publishing.

So you've added gloss and pizzazz. You've got a way-cool look and feel to your intranet and staff use has exploded. More information is traveling around the network faster than ever before. Now, lest you want to get caught with your hip designer pants down, how's your security?

"Fine," you say? Well, if your security is fine, you're an exception. Based on polls taken of people attending my intranet education seminars, I estimate that somewhere between one in 70 and one in 100 organizations have what I would consider a security plan.

Sure, lots of organizations have bits of a security plan, but that's like being described as slightly healthy — the truth is, you're actually mainly sick. So it is with partial or nonexistent intranet security plans: You really have a vulnerable intranet.

The security plan should detail how user accounts are set up and by whom, what resources are given to users as standard, what checks on resource use are made, how and when backups will be done and by whom, and the other millions of details of running an enterprise network.

One of the most important parts of the plan is collecting the data from logs generated by devices and processes (see story, page 46).

For example, you have firewalls. (You do use firewalls, don't you? You don't! We need to talk about this.) Firewalls generate log files, but unless you examine these logs regularly, you have no idea what's going on with them. How many break-ins have been attempted? If you don't examine the logs, you may never know that you're under attack until it is too late.

I could go on for several columns about the need for security plans (and I probably will), but for the time being, consider how cool you'll be if your intranet suffers a security breach. Resume writing is simply not cool in the slightest.

So, to be intranet-cool, give the organization visually compelling reasons to use the intranet and have a security strategy that keeps it private, secure and effective.

If your intranet is really cool, we may even see you written up in *IntraNet*. Now that's what I call way cool.

Is your intranet hip and happenin'? Let Gibbs know at mgibbs@gibbs.com or call him at (800) 622-1108, Ext. 504. ⊜

Gibbs is a writer, analyst and editorial consultant for IntraNet.

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Circle Reader Service **#16**

Development tools

AI progeny concentrate on HTML

By Doug Barney
Santa Barbara, Calif.

More than two decades after Marvin Minsky founded the MIT Artificial Intelligence Lab, his twin children have taken on another challenge: adding beef to HTML.

Minsky progenies Henry and Juliana are executives with Universal Access, Inc., which will today unveil Meta-HTML Pro, a superset of the popular Web language.

Juliana Minsky *handles marketing.*

This $2,500 Unix-based server scripting language, set to ship Dec. 2, brings macros, data structures, I/O control and 130 new tags to HTML.

With Meta-HTML Pro, users can dynamically update large numbers of pages, which can be viewed using any industry-standard browser.

"Global changes is the key," said David Guzeman, chief operating officer of Universal Access.

The language extensions are based around new tags, which is the way HTML tells the browser what to do with text, graphics or hyperlinks. For example, a tag could create a large headline or insert a graphic.

Henry Minsky *is CTO.*

One key tag, "Include," controls elements such as logos, headers and colors. With this feature, cosmetic changes made to one page can be applied to others.

The Open Database Connectivity tag uses the Microsoft Corp. protocol to tie Web sites to databases. Meta-HTML also comprises tags to create forms that can retrieve data and forms that can mail out information. Users can also create custom tags.

Web pages are created using a combination of Meta-HTML and standard HTML statements.

Meta-HTML currently runs under all major flavors of Unix. A Windows NT version is planned for the first quarter of next year.

PowerStrips

Meta-HTML includes PowerStrip, a prebuilt Web site that acts as a tool kit and can be customized for a variety of businesses. PowerStrip includes configurable passwords, dialogue screens and design elements.

Although Universal Access is serious about extending HTML, it expects the bulk of its business to come from add-ons, which will sell for $2,500 each.

The company is prepping one such add-on — a software downloader that tracks users to ensure software license compliance.

Universal Access is also planning an E-Mail List Manager, priced at $2,500, which will allow end users to go to a central site to subscribe or, perhaps more importantly, unsubscribe from E-mail lists.

Universal Access was founded in 1994 as an Internet service provider by Chief Technology Officer Henry Minsky and President Michael Fredkin. Juliana Minsky, also a founder, serves as vice president of marketing.

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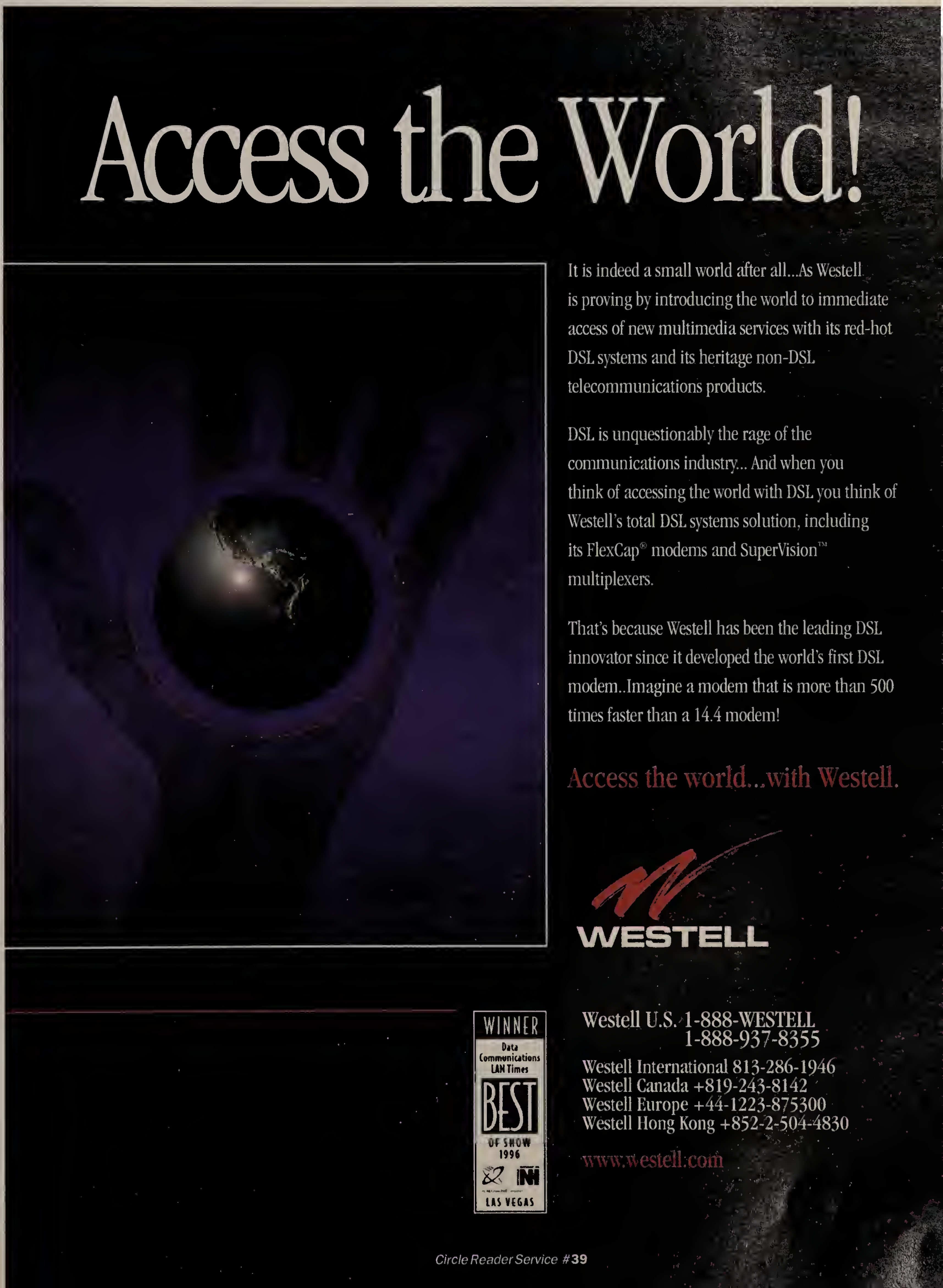

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Circle Reader Service #39

Wary investors demanding more of Internet companies

By Chris Nerney

Cambridge, Mass.

While the euphoria that deluded Internet start-ups and their investors has dissipated since last July's stock meltdown, long-term prospects for Internet market investments are now excellent.

That was the consensus of a panel of venture capitalists at Venture Market East, a two-day conference here at which 65 high-tech companies seeking financing tried to convince private investors that they could be the next Netscape Communications Corp.

Netscape's initial public offering (IPO) in July 1995 was so successful that dozens of small Internet companies were inspired to go public as a way of raising capital. Most had no problem finding eager shareholders. By last spring, the Internet fever that gripped public investors had peaked.

"People with basically a business plan and very little operating history could go out and finance $30 million or $50 million, which is way in excess of what they could find in the venture market," said Katherine Kirk, managing director of Hambrecht & Quist's Boston office and a panelist at the 1996 IPO Bubble keynote session.

The problem, said panelist Kevin Maroni, a principal with Spectrum Equity Investors, "is that not everyone can be successful at this. The values can't be sustained. Someone has to lose."

On July 11, the investing public woke up to that reality. Stock prices plummeted for high-profile, low-profit companies such as Lycos, Inc., Infoseek Corp. and Excite, Inc. (see graphic). And the sudden chill in the market prompted many Internet companies with plans for IPOs to back off until the investing climate improved.

SOME INTERNET STOCKS ARE BACK ON THE RISE

Price per share for selected Internet stocks before and after July IPO "bubble":

Company	June 30	July 31	Oct. 31
Excite	$8	$7	$6
Lycos	$11	$6	$10.5
Open Market	$25	$18	$23
OpenText	$10	$7	$7
Infoseek	$10	$7	$10

That's already happened, according to panelist Kenneth Mabbs, a senior vice president with First Albany Corp. "We're back to the pre-crash levels," he said. "The filings are back, the cash flow, the venture capitalists are flush with cash."

Private and public investors may indeed remain eager to place bets on Internet companies, but they remain gun-shy about "concept deals" — companies with seemingly good products or ideas, large potential markets and little else.

"The market, as far as concept deals, is run by emotion," said panelist M. Benjamin Howe, managing director of Montgomery Securities' East Coast Technology Group. "We're at an emotional low for Internet concept deals. I think maybe even lower today than we were in July."

So how can small Internet companies looking for capital attract investors?

"People need to see a differentiated story," Kirk said. "They need to see a marketplace where you look like you could have a lead in the market you're in. And you need to show people that you're going to be making money in the not-too-distant future."

"For the long haul, the Internet market is red-hot," Howe said. "It's a market that we're going to continue putting a ton of resources in."

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*Circle Reader Service #***50**

Kodak

Continued from page 55

camera software drivers for connecting peripherals up on the Web for free download and has seen about 100,000 downloads so far this year.

Kodak refrains from selling equipment online — or mentioning prices — to avoid disrupting its established distribution network.

But it will start selling movie film to cinematographers at its site.

The Web will soon provide a way for Kodak product dealerships to place orders with the company. But first Kodak wants to make its Oracle Corp. relational database available to trading partners via the Web.

To do this, Kodak next month will install Oracle's Universal WebServer to connect back-end Oracle databases, a setup that Lund said he expects will be faster than the current arrangement.

Currently, Kodak relies on a separate Hewlett-Packard Co. Unix server running HP's DB Manager (DBM) to provide product catalogues and environmental reports via Common Gateway Interface (CGI) scripts to Kodak's Netscape Web server.

"Right now, DBM is somewhat rudimentary sitting on the Web site," Jamerson said. Dropping DBM for the Oracle Web server will free Kodak from having to duplicate data already sitting in its Oracle database, he added.

"Once we have the relational database available, we can have multiple ways to index the data with all the dealer and product information," Jamerson said.

To authenticate dealers' identities so they can place orders over the Web, Kodak intends to try out the Oracle certificate servers for digital identifications.

In their lighter moments, *members of Eastman Kodak's Internet marketing division like to call themselves "the Webmasters." Shown here, left to right, Terence Lund, Wayne Neale, Judy Goonan, Michael Pagano, Ronald Jamerson and Suzanne Welch.*

"We see opportunities in two areas to use the 'Net to sell products," said Judy Goonan, Internet commerce manager. "The Business Imaging Systems [division] will have a pilot in the spring to sell supplies to our distributors. What we're also finding is we need more two-way commerce so they can reach systems to find out delivery dates and back-order status."

Kodak, which encrypts virtually everything on its intranet using RSA Data Security, Inc. public-key technology, plans to encrypt sensitive information between the server and the client using Netscape's Secure Sockets Layer.

When it comes to Web servers, Kodak will soon be moving from the Netscape Commerce Server to the newer Netscape Enterprise Server because it has FastCGI and server-side APIs for faster delivery of Web pages to the reader.

The Kodak team of marketing and technical professionals sometimes argues about the approaches individuals want to take on the Web. Neale, who is responsible for overall site design, usually arbitrates the disputes.

"I analyze the requirements at Kodak and, in a systems approach, I put the customer — the user — in the center of the system," said Neale, who holds a Ph.D. in human-computer interaction, a specialized field of industrial engineering.

The Kodak crew agreed that Neale plays an invaluable role brokering peace between the marketing and technical arms of the Internet effort. ■

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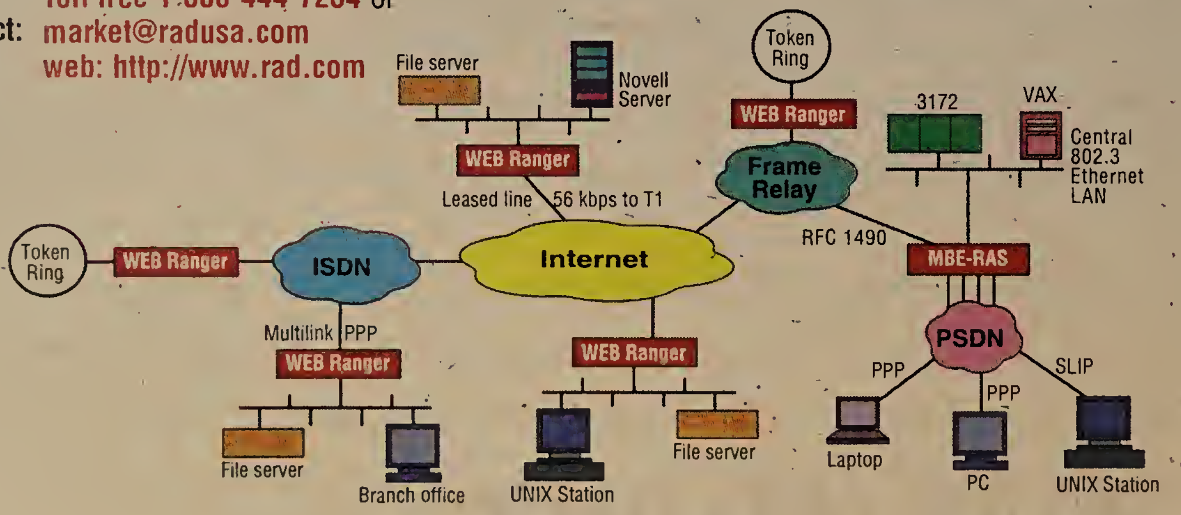

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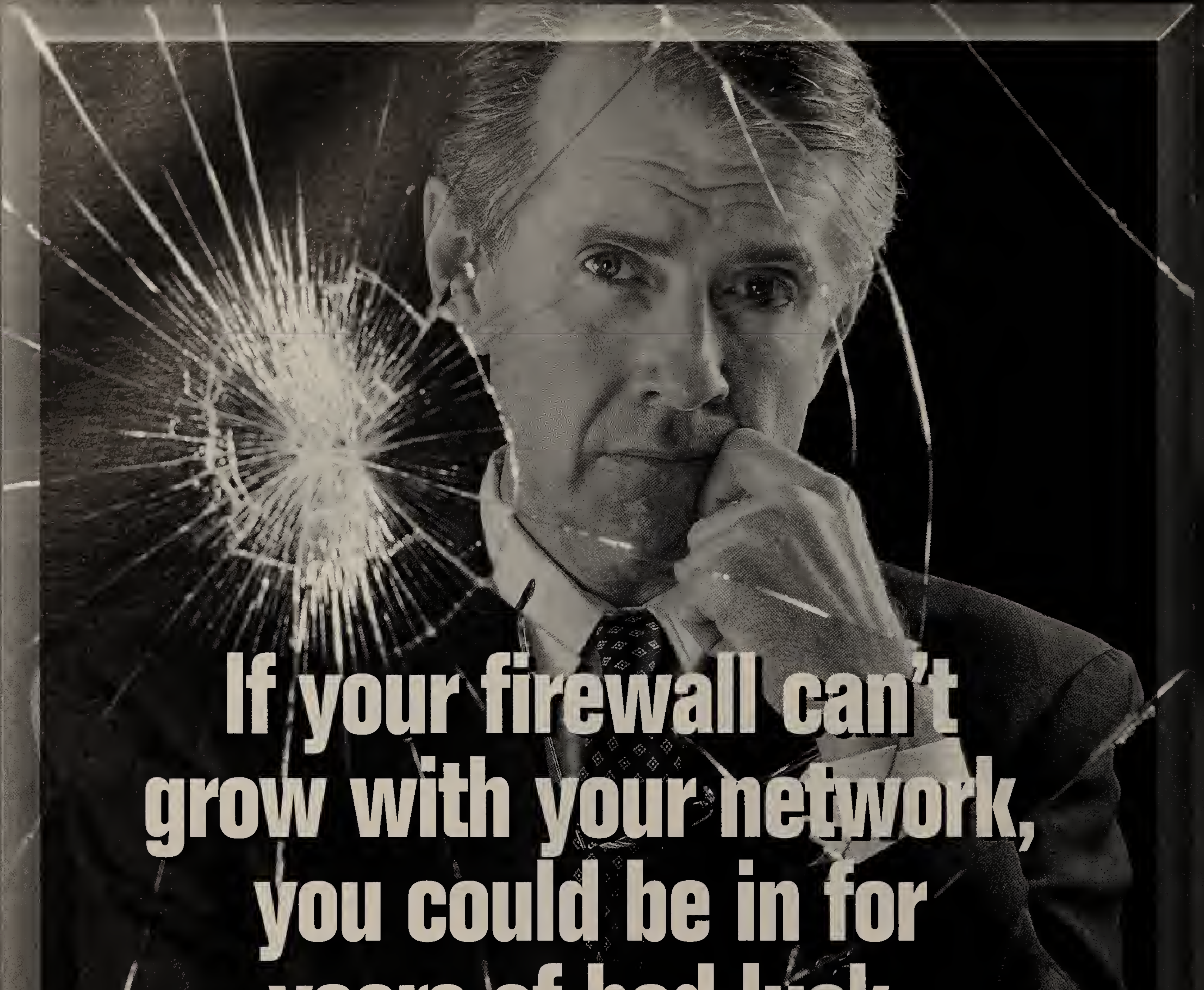

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Circle Reader Service **#51**

Technology Update

Keeping Up with Network Technologies and Standards

NUTTER'S NETWORK HELP DESK

Ron Nutter, a Master Certified Novell Engineer and Groupware CNE in the Lexington, Ky., area, tracks down the answers to your questions. Call (800) 622-1108, Ext. 476, or send your questions to rnutter@world.std.com.

Is there a way to reboot a Novell, Inc. NetWare 3.12 server through a remote dial-up connection to a workstation?

Via the Internet

You have several options for rebooting the server by dialing up through a workstation. For example, you can use a BSR X-10-like device to turn power to the server off and then back on. The X-10 modules receive their control signals via the AC in the walls. The modules can be controlled via a console that connects to a push-button phone, or from a console that connects to a PC's serial port and is managed using a DOS or Windows program.

The drawback is that these kinds of devices are somewhat brute force in their power management scheme.

Alternatively, you can use RCONSOLE to build a NetWare Control File that can assist in rebooting from a workstation when the file is placed in the server's SYS:system directory. The file, to be called Reboot.ncf, needs to contain the following three lines: "Remove DOS," "Down" and "Exit." This sequence will remove DOS from memory and then reboot the server.

How can I replicate Novell Directory Services (NDS) and rebuild it from the replication?

Via the Internet

You can use DSMAINT, the NetWare 4 version of Bindfix and Bindrest. After running the utility, a file called Backup.ds is created in the SYS:system directory. You can copy this file, and the versions of DS.NLM and DSMAINT.NLM under vhich it was created, to a floppy lisk. This will allow you to create an cxact copy of NDS on another erver.

The menu options for DSMAINT re easy to understand. It is important to note, however, that you have o use the same or a later copy f DS.NLM running on the scrver nto which you wish to restore NDS.

'Net messaging servers lead way to E-mail nirvana

By Valdur Koha

Nearly every major business process revolution — including global supply chain partnerships, electronic commerce and the virtual corporation — demands a secure, scalable and high-fidelity electronic messaging infrastructure capable of handling not just simple text messages but multipart, multipurpose attachments.

Proprietary, LAN-based E-mail systems provide relatively good functionality for use within corporate networks. However, beyond the LAN — where virtual departments, companies and customers dwell — lies the ideal highway for E-mail: the Internet. Infinitely scalable, standards-based, reliable and robust — the Internet is the fundamental platform for messaging in full fidelity.

A mere blip on the radar screen just a few years ago, Internet mail has caught on like wildfire. For example, Qualcomm, Inc.'s Eudora boasts more than 10 million users, making it one of the largest overall E-mail client installed bases ever. And International Data Corp., a market research firm in Framingham, Mass., estimates by the year 2000 the number of 'Net-based E-mail boxes will fall just short of 50 million, representing roughly 19% of all E-mail boxes worldwide.

Responding to this migration to Internet messaging, proprietary E-mail system vendors are working to add open Internet protocol support to their offerings — a formidable task because, for them, the Internet is a strange new world.

Many network administrators can't wait for vendors of proprietary systems to add support for Internet protocols. Administrators need a flexible messaging infrastructure that can handle their companies' exploding demand for global communications. The key to meeting this demand is to implement messaging servers based solely on native Internet protocols.

Heart and soul

The new breed of native Internet messaging servers is the heart and soul of this open infrastructure. Through native support of 'Net protocols such as the Internet Messaging Access Protocol, Simple Mail Transfer Protocol and Post Office Protocol, the native Internet messaging server ensures connectivity across networks worldwide, provides universal E-mail client access and adds value in crucial new areas such as system security, ease of administration and scalability (*NW*, Oct. 14, page 49).

Native Internet messaging delivers seamless interoperability among disparate users. Furthermore, open Internet protocols enable messaging system vendors to build products that can communicate in the same language, without the need for the gateways or connectors that typically introduce choke points in a network.

The architecture of the newest commercial-grade Internet messaging servers provides direct connections between messaging servers across the Internet, allowing for efficient, high-speed message delivery to the addressee with few, if any, hops along the way.

By contrast, proprietary E-mail systems must first bypass the centralized routers and hub centers that typically create bottleneck and gateway problems and result in longer, less reliable message delivery.

Given the growing demand for E-mail, a system's scalability is paramount, as is the need to connect the growing number of users who send more complex documents along the network at higher speeds. Internet messaging servers are designed to harness the infinite scalability potential of the Internet. Multithreading and distribution technology allows these servers to scale upward as demand grows. Such messaging servers can support and manage thousands of concurrent users and millions of mailboxes.

E-mail nirvana

Native Internet messaging servers are the backbone of the newest E-mail systems connecting users across and among enterprises worldwide. But where does this leave the 10s of millions of users of proprietary E-mail systems? It basically comes down to two choices: Wait until vendors embrace open Internet standards or deploy native Internet messaging servers now.

For those taking the latter tack, popular Web browsers such as Netscape Communications Corp.'s Navigator and Microsoft Corp.'s Internet Explorer include full-featured 'Net E-mail clients that work with native Internet messaging servers. This gives organizations that have large proprietary E-mail installations the ability to support Internet E-mail without incurring productivity penalties for inside-the-LAN communications.

By capitalizing on the Internet's strengths to provide an infrastructure that guarantees security, performance and ease of administration, native Internet messaging servers are enabling a revolution in global communications.

As native Internet messaging takes hold, and as proprietary systems give way to Internet-based communications, interoperability among servers will provide a fast, secure and reliable platform for all electronic messaging applications.

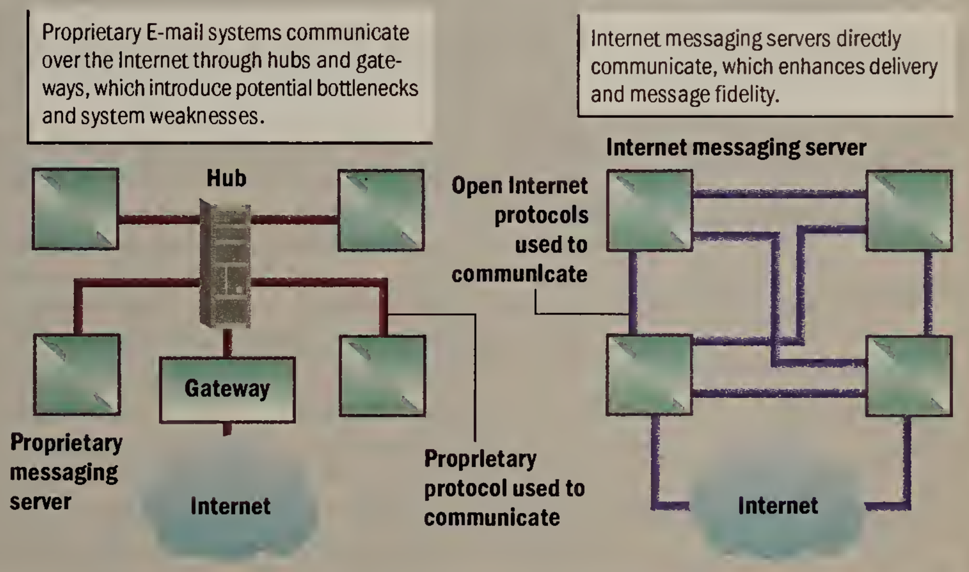
By enabling electronic commerce, shared calendars and scheduling, through high-fidelity document interchange — the promise of reliable, secure and timely, mission-critical business communications is that much closer to reality.

Koha is president and chief operating officer of Software.com, Inc., an Internet infrastructure company with offices in Lexington, Mass., and Santa Barbara, Calif. He can be reached at valdur.koha@software.com.

UP CLOSE

Messaging across the Internet

Internet messaging servers streamline the process of sending E-mail among disparate systems by supporting open protocols such as Simple Mail Transfer Protocol.


Proprietary E-mail systems communicate over the Internet through hubs and gateways, which introduce potential bottlenecks and system weaknesses.
Hub
Gateway
Proprietary messaging server
Internet
Proprietary protocol used to communicate
Internet messaging servers directly communicate, which enhances delivery and message fidelity.
Internet messaging server
Open Internet protocols used to communicate
Internet

Need information?

Let *Network World* provide a quick primer on an important or emerging technology. If you have an idea for Technology Update, contact Beth Schultz by phone at (773) 283-0213 or via the Internet at bschultz@nww.com.

EDITORIAL *insights*

Get ready for the Battle in the Beltway!

Mark your calendars: *Network World's* Switching Showdown is on for the ComNet '97 conference in Washington, D.C.

In September, I asked the CEOs of the so-called Big Four internetworking vendors — Bay Networks, Inc., Cabletron Systems, Inc., Cisco Systems, Inc. and 3Com Corp. — to send their top technologists to a presidential-style debate on switching. All of them came through.

So at 1:30 p.m. on Wednesday, Feb. 5, in the Grand Ballroom of the Renaissance Hotel, our contestants will square off to debate switching strategy and field tough questions from moderators including the respected analysts Tom Nolle, president of CIMI Corp., and Kevin Tolly, president of The Tolly Group.

And this is no shy, retiring group of combatants.

In one corner, we will have **Cisco VP Jayshree Ullal,** a key executive at FDDI-over-copper-vendor Crescendo before its buyout by Cisco.

In the opposite corner, we'll have **Cabletron's Chris Oliver**, director of engineering and technology visionary for the hard-charging hub maker.

And in the remaining two corners (blatant abuse of the boxing metaphor), we'll have **Bay Networks' Bill Hawe,** late of Digital and now Bay's VP of architecture, and **3Com's Mick Seamen,** VP and chief technology officer.

The moderators and I will challenge the panelists to differentiate their switching strategies. The panelists will also get to ask each other pointed questions.

The idea is to help you understand where the companies are going and make it easier to choose which vendor best meets your needs. Until now, the switching fight has been largely a marketing battle, with all the players making similar claims about how they will move your networks beyond shared LANs.

There are still some things to be resolved before the bell sounds in February.

1. What do you want to know about the switching plans of these companies? Drop me a note with your questions.

2. Do you want to join us on stage? I'd like to have two customers help ask the questions. I've got some volunteers already, but if you'd like to join us, drop me a note explaining why you ought to take part.

3. Should other vendors take part? IBM, FORE Systems, Inc., Digital Equipment Corp. and others have expressed interest.

4. Can you come up with a better tagline than the one in the headline? We kicked around lots of catchy names for the debate — from the **Beltway Brouhaha** to the **Scrap in the Cap,** the **Fray in the Beltway** to the **D.C. Donnybrook**. Can you top them?

John Gallant, editor in chief jgallant@nww.com

Totally Unplugged • Ira Brodsky

Critics try to sink CDMA

Sure, conspiracy theories are seductive. That's why I did a double take when I realized one had infected the telecommunications industry.

According to some pundits, dozens of telecommunications firms have bet their futures on a new radio technology, called Code Division Multiple Access (CDMA), which everyone knows will never work. Allegedly, these companies are victims of the "CDMA Mafia." Like zombies, hundreds of executives are committing hari-kari just to drive up CDMA inventor Qualcomm, Inc.'s stock price.

This story would probably end in a psychiatric ward were it not that the conspiracy theory has found an audience. After all, how could so many firms have selected such an "unproven" technology?

There is a good answer to that question. More than 90% of the world's inhabitants have never made a phone call. In developing countries, wireless could prove the quickest and least expensive way to deliver basic telephone service. In developed countries, wireless will play a crucial role in introducing local phone competition. CDMA is a high-risk solution, but if it works, the rewards could be awesome.

Today, there are two contenders for the title of global wireless standard: Time Division Multiple Access (TDMA) and CDMA. The winner will be the one that offers the least expensive airtime — and that will be the one that offers the greatest capacity.

TDMA promises higher capacity by dividing conventional radio channels into time slots. In essence, TDMA serves more users by giving each less. TDMA is the basis for the global system for mobile communications (GSM), a government-mandated standard in Europe.

CDMA takes a radically different approach: It puts multiple users on the same wideband channel at the same time by assigning each a unique "code." In a sense, CDMA serves more users by giving each more. Compared with TDMA, CDMA promises greater capacity, better coverage, enhanced audio quality and extended battery life. The first CDMA commercial services were launched in Asia; in the U.S., large-scale CDMA launches are under way.

Is CDMA a fraud? More than 40 companies have licensed CDMA technology, including Northern Telecom, Inc. and Hughes Network Systems, Inc. More than 20 cellular and personal communications services (PCS) carriers are deploying CDMA, including Ameritech Cellular Services and GTE Mobilnet, Inc. And MCI Communications Corp. has agreed to purchase 10 billion minutes of CDMA airtime from Qualcomm spin-off NextWave Telecom, Inc.

But the conspiracy theory explains it all away. Why would so many companies buy into CDMA? Because Qualcomm Chairman Irwin Jacobs is a slick salesman. Why would Motorola, Inc. and Lucent Technologies, Inc. make CDMA the centerpiece of their wireless strategies? Because they have no other strategy; Ericsson and Nokia Corp. already dominate the TDMA market (but just to be safe, they have also purchased CDMA licenses). And why would a savvy company such as MCI let itself be swindled? Because MCI has outsmarted the swindlers: The deal includes warrants for NextWave stock that will let MCI pick up some inexpensive spectrum when the CDMA scam unravels.

Still, there are nagging questions. Usually, when people realize they've been hoodwinked, they demand retribution. But not CDMA victims. Somehow, the perpetrators of this fraud have found a way to transform their victims into fresh recruits. For example, AirTouch Communications, Inc. must know by now the CDMA network it built in Los Angeles doesn't work, yet the company insists it does. And Sprint PCS and PCS PrimeCo L.P., two of the three largest PCS licensees, continue to bet the farm on CDMA.

Nope, there is a simpler explanation. CDMA entrepreneurs have arrows in their backs because they are pioneers. The only thing they are guilty of is daring to develop a superior technology.

Conspiracy theories may be alluring, but they are almost always false. What really makes the pundits paranoid is the possibility CDMA will succeed.

Brodsky is president of Datacomm Research Co., a Wilmette, Ill., consulting firm. He can be reached via the Internet at ibrodsky@ix.netcom.com.

MESSAGE QUEUE

Send letters to nwnews@nww.com or John Gallant, editor in chief, Network World, *161 Worcester Road Framingham, MA 01701. Please include phone num
ber and address for verification.*

Not jumping for joy

Regarding Mark Gibbs' column "Th
case of the jumping cursor: A myster
solved but no cure" (Oct. 7, page 90)

I've experienced the jumping cur
problem with my Canon Corp. Innov
350C notebook computer while editi
source code and data files with a text
tor in DOS. Talk about introducing b
into programs inadvertently. I have
enough trouble writing bug-free cod
without the jumping cursor. If you d
look up and notice that the cursor is
the wrong line, you could overwrite g
code.

Len Epstein
President

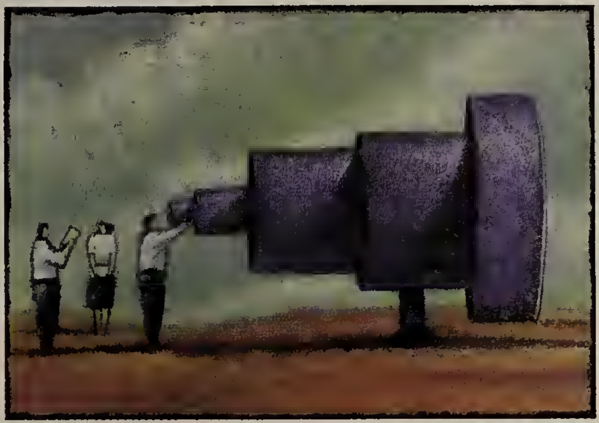
The Blue View • Anura Gurugé

Browser-based access revitalizes SNA world

Web browsers, having popularized Internet access over the past few years, are now set to weave their considerable magic across the SNA world. IBM 3270 datastream-to-HTML conversion and SNA-Web coprocessor technology hit the market earlier this year. Now PC and workstation users can effortlessly access mission-critical SNA applications, running on mainframes or IBM Application System/400s, with the same Web browsers they use to access the Internet.

With 20-year-old SNA-only networks now becoming anachronistic, enterprises are looking at multiprotocol broadband networks that will better meet the needs of their new client/server applications while still permitting unfettered access to SNA applications. Intranets are increasingly being viewed as a strategic option.

Browser-based access to SNA applications provides a cogent answer to the crucial question of how mission-critical SNA applications can be seamlessly and reliably integrated into an intranet. Browsers also allow easy, secure access to SNA applications across the Internet — a boon to mobile users and telecommuters.



In addition, browser-based access offers the means and the motivation for giving the grossly outdated user interface of most SNA applications a much-needed facelift — one that does not require modifying or updating the mainframe- or AS/400-resident application in any way. Instead, the facelift process can be accomplished — using a number of different techniques and tools — as an integral part of the SNA-Web conversion process.

Thanks to such conversion, the SNA applications will continue to send and receive the same 3270 datastreams they have been using unchanged for the past 10 years or so. Users, however, will now enjoy a brand-new, contemporary interface replete with buttons, drop-down option fields, textured backgrounds and possibly even soothing background music. Browser-based access will thus not only revolutionize SNA applications access, but also revitalize the applications and propel them into the 21st century.

This does not mean that the 20 million or so users that routinely access SNA applications will, in unison, switch to browser-based access next year. Technological conservatism is still a basic tenet in the SNA world — given that jeopardizing access to business-critical applications is unlikely to be career enhancing.

What we will see instead, is a rapidly growing awareness of, and interest in, this technology as a strategic, logical and long-term solution to SNA access. By 1998 or thereabouts, browser-based access will be perceived as what it really is: The most significant development in SNA access since the advent of the PC in 1981.

Quite a few enterprises are already successfully and profitably using browser-based access, even though this technology is less than a year old. This is because browser-based access does not require end-to-end or extensive reengineering. Instead, the SNA-Web processing technology can be added to existing SNA gateways or tn3270 solutions, leaving the SNA portion of the network unchanged.

Browser-based SNA access can also be thought of as the next generation of tn3270-based access, which has experienced explosive growth this year.

Browser access technology is evolving rapidly, and more solutions and innovations certainly will arise over the next few months. These will include channel-attached SNA-Web processors, and even mainframe-based conversion that is analogous to mainframe-resident tn3270 servers.

Above all, reliability, security, performance and integrity are the key requirements of any SNA-related solution. There are differences in implementation that could affect some or all of these criteria, differences users should consider carefully when selecting a browser-based solution.

The HTML-to-3270 conversion is performed in two very different ways. Some users do the conversion on the fly using a connectionless protocol between the browser and the conversion engine.

Others, typically using a Java (or equivalent) applet that runs on the PC in concert with the browser, create a persistent end-to-end connection that mirrors an SNA session.

There can also be differences in the levels of end-to-end security available, the flexibility in keyboard mapping and the facility for reinvigorating the user interface. Users should carefully consider these differences and pick a solution that does not, in any way, compromise the mission-critical nature of their SNA applications.

Browser-based access enticingly addresses most, if not all, of the requirements of SNA application access vis-a-vis intranets and the Internet. In time, we will look back and see that browser-based access was as significant a development in the evolution of SNA as PCs, token ring and frame relay.

Gurugé is an independent consultant specializing in internetworking and IBM network architectures. He can be reached at (603) 878-1303 or via the Internet at aguruge@mcimail.com.

ompNet, Inc.
rinceton, N.J.

e prepared

y organization was one of those
nocked out by the recent BBN
lanet outage (Oct. 21, page 1).
ince I'm concurrently building
ission-critical Internet applica-
ons, you can imagine my rest-
ss weekend.

In response, I'm building my
et with two Internet service pro-
ders — BBN and MCI Commu-
ications Corp. But how do I
eep the router configurations
raight?

In normal operations, I want
keep my companywide Net-
ape surfers from degrading
e T-1 that's serving my cus-
mer base on the incoming ISP.
I'll prevent the 'Net surfers
om discovering the route to the
P that's providing my inbound
stomer services — at least
at's my current plan.

But if my primary ISP fails, I want to be able to make a quick switch to the other ISP. My network adminstrators give me dirty looks when I broach this subject.

Should I keep a Trivial File Transfer Protocol server in the network that can upload new router configurations, and employ Dynamic Host Configuration Protocol to let the users get new downstream addresses on demand? And what about the firewall settings? Ugly, but that's about the best I can think of.

Failover and high availability on networks is of great interest to me. Keep up the good work writing about these topics. Any and all suggestions are welcome.

Daniel Rinne
Manager, IMS Technical Services
California Student Aid Commission
Sacramento, Calif.

Demand proof

Regarding your article "Gurus prove that encryption's not all it's cracked up to be" (Oct. 28, page 1):

The quote saying Bellcore had cracked a smart card based on RSA Data Security, Inc.'s encryption algorithm using an attack scenario similar to the one used by the Israeli cryptographers is wrong.

There are two issues. First, did Bellcore commit a valid attack on the algorithm? Second, can it convert that algorithm attack to a successful attack on a smart card?

I pursued the second issue with Bellcore. The response I received from Ken Branson, Bellcore's manager of media relations, stated: "Bellcore has never claimed, and does not claim, to have conducted an actual attack on a smart card — or on any other computing device. Indeed, in all our conversations with journalists and customers, we have emphasized the theoretical nature of the attack."

It is easy to casually claim smart card attacks. However, I have not seen any specific results or test presentations.

In short, your reporter should have asked for evidence that such claims are more than casual.

Jerome Svigals
Vice president
Jerome Svigals, Inc.
Redwood City, Calif.

Teletoons

Hey, Jed... found me a lost dog! Gotta contact the owner! Access "http://www.fifi.com" fer me, okay? 'Prreciate it!
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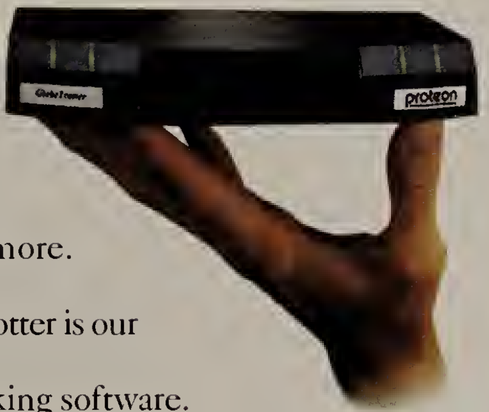

GlobeTrotter offers security features not found on routers costing thousands more. Because inside every GlobeTrotter is our standards-based internetworking software.

Keep the bad guys out

Thanks to OpenROUTE, call ID authentication, IP anti-spoofing, and dynamic filtering are standard on GlobeTrotter. For more security, try GTSecure: it's a GlobeTrotter with dynamic firewall capability and RADIUS technology.

Guaranteed interoperability

GlobeTrotter will connect with just about any popular networking product. We continually test to ensure OpenROUTE is completely interoperable.

Simple to install and use

Just plug GlobeTrotter in and forget it – again, thanks to OpenROUTE. Self-configuring and self-maintaining, the GlobeTrotter is perfect for offices even where there's no technical help.

Fast really means fast

OpenROUTE gives GlobeTrotter outstanding data compression throughput and short call set up times. So you can take full advantage of dial up, frame relay, ISDN or leased line.

Low price to buy, low cost to own

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Series 60/62
Internet/Intranet Remote Access Routers.
For those looking for easy IP dial-up, frame relay, or leased line connections, or IP, IPX, Appletalk routing or bridging.

The GlobeTrotter
Series 70/72
Internet/Intranet Remote Access Routers.
For those looking for easy IP dial-up ISDN connections, or IP, IPX, Appletalk routing or bridging over ISDN.

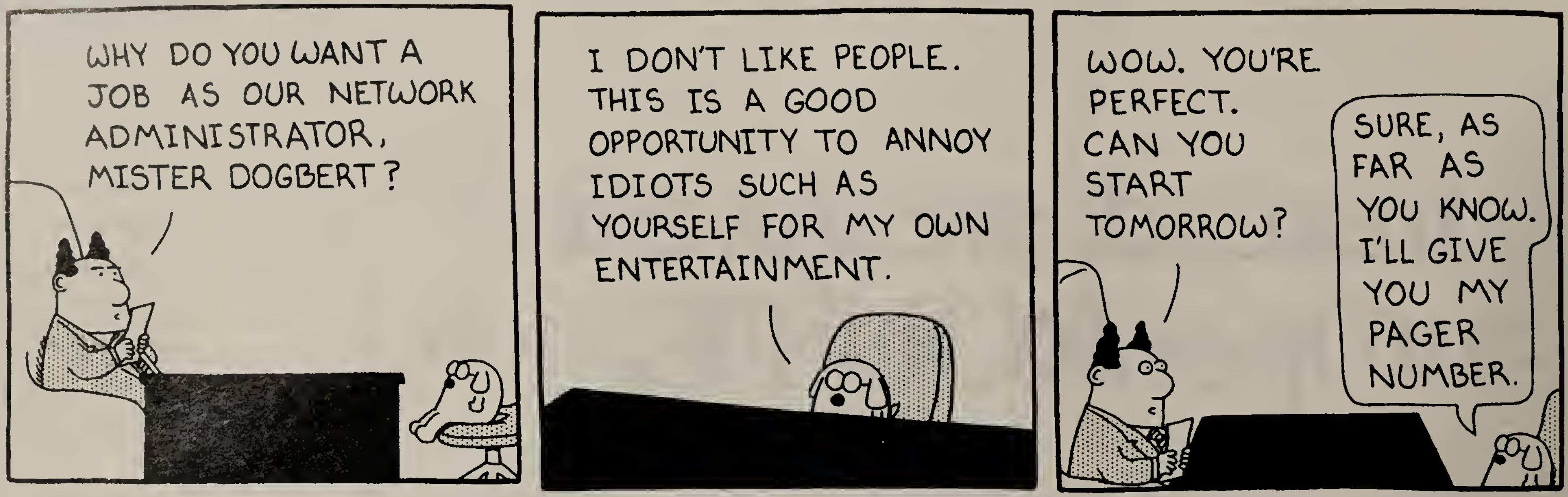
GlobeTrotter Product Page
www.proteon.com/
mktg/gtfam.htm

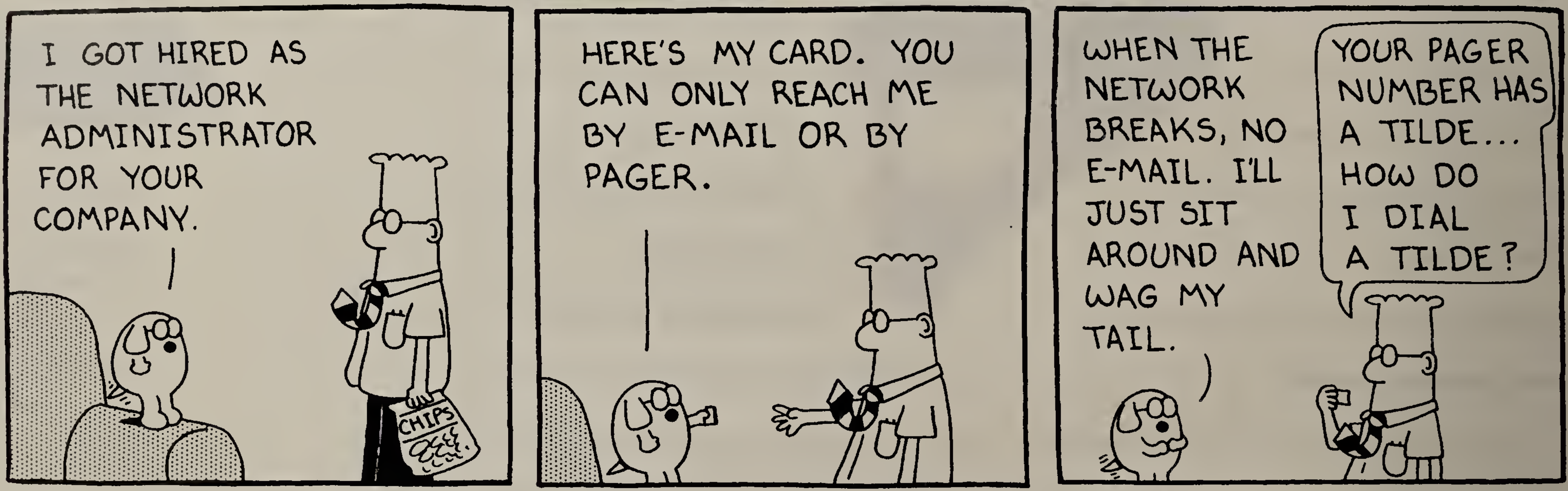
Internet GlobeTrotter network access

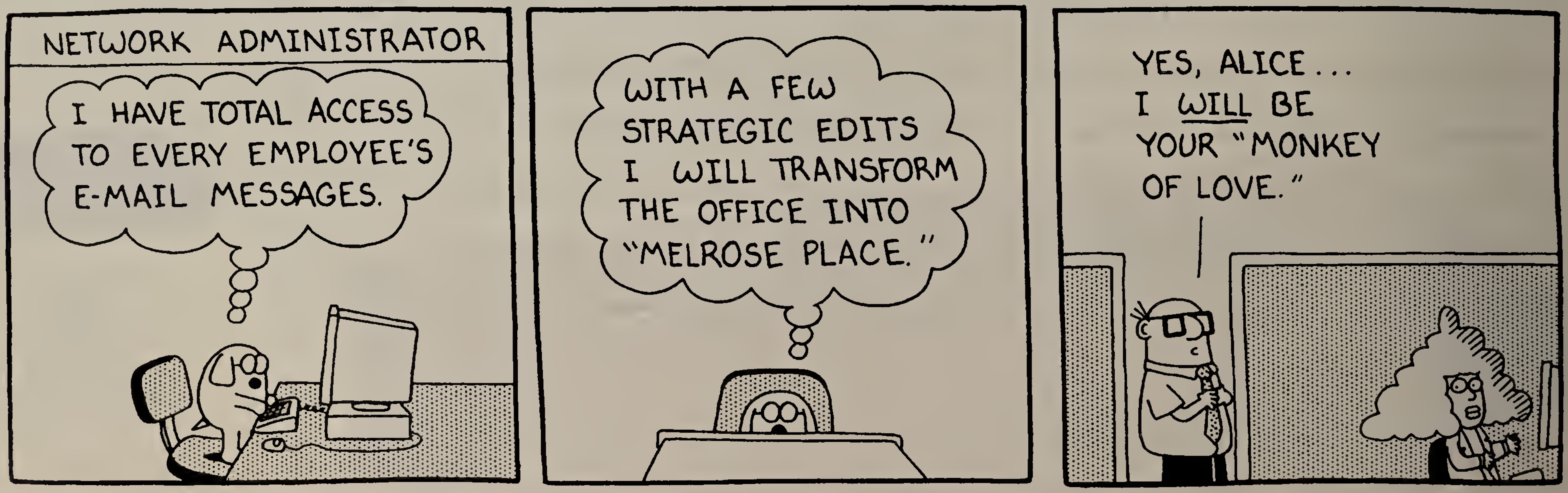
GlobeTrotter

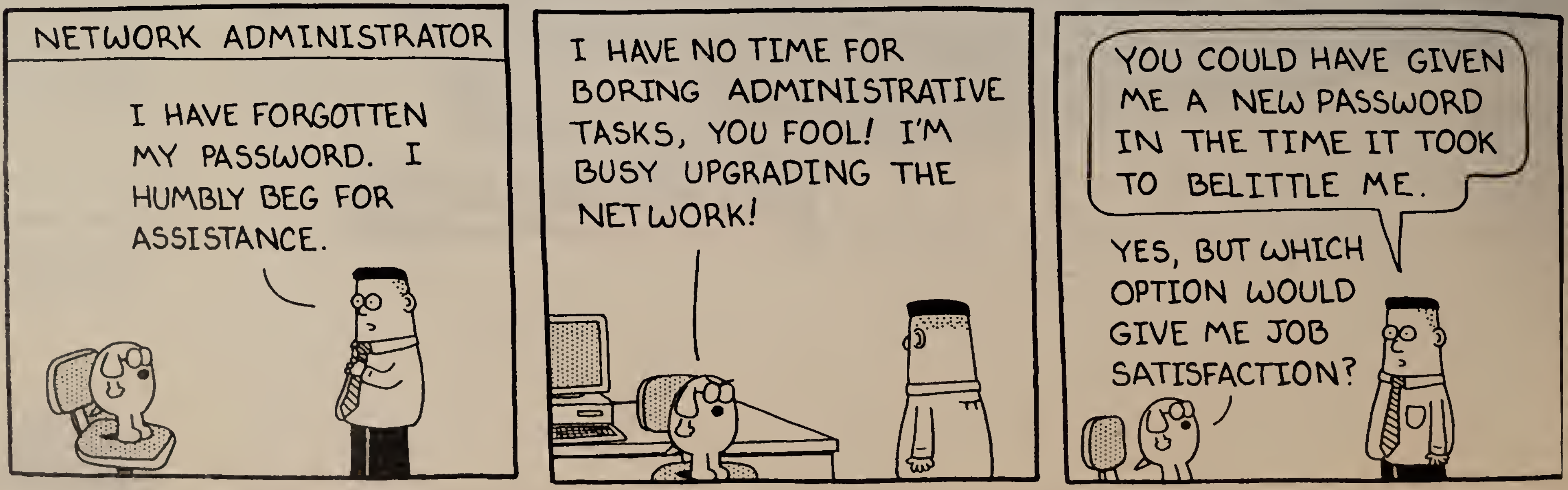
Circle Reader Service #32

Scott Adams, creator of the Dilbert® cartoons, has of late set his sights squarely on the role of the network administrator. We thought you'd enjoy his take on your jobs, so we picked a few from the series. Enjoy.


WHY DO YOU WANT A JOB AS OUR NETWORK ADMINISTRATOR, MISTER DOGBERT?
I DON'T LIKE PEOPLE. THIS IS A GOOD OPPORTUNITY TO ANNOY IDIOTS SUCH AS YOURSELF FOR MY OWN ENTERTAINMENT.
WOW. YOU'RE PERFECT. CAN YOU START TOMORROW?
SURE, AS FAR AS YOU KNOW. I'LL GIVE YOU MY PAGER NUMBER.


I GOT HIRED AS THE NETWORK ADMINISTRATOR FOR YOUR COMPANY.
CHIPS
HERE'S MY CARD. YOU CAN ONLY REACH ME BY E-MAIL OR BY PAGER.
WHEN THE NETWORK BREAKS, NO E-MAIL. I'LL JUST SIT AROUND AND WAG MY TAIL.
YOUR PAGER NUMBER HAS A TILDE... HOW DO I DIAL A TILDE?


NETWORK ADMINISTRATOR
I HAVE TOTAL ACCESS TO EVERY EMPLOYEE'S E-MAIL MESSAGES.
WITH A FEW STRATEGIC EDITS I WILL TRANSFORM THE OFFICE INTO "MELROSE PLACE."
YES, ALICE... I WILL BE YOUR "MONKEY OF LOVE."


NETWORK ADMINISTRATOR
I HAVE FORGOTTEN MY PASSWORD. I HUMBLY BEG FOR ASSISTANCE.
I HAVE NO TIME FOR BORING ADMINISTRATIVE TASKS, YOU FOOL! I'M BUSY UPGRADING THE NETWORK!
YOU COULD HAVE GIVEN ME A NEW PASSWORD IN THE TIME IT TOOK TO BELITTLE ME.
YES, BUT WHICH OPTION WOULD GIVE ME JOB SATISFACTION?

DILBERT reprinted by permission of United Feature Syndicate, Inc

HEAD-TO-HEAD

Metcalfe Bradner

Should we be concerned about a cataclysmic failure in the Internet?

MILLICENT HARVEY

Bob Metcalfe, vice president of technology for *Network World* parent International Data Group, and a columnist for our sister publication, *InfoWorld*, has been predicting for months that a catastrophic Internet failure would occur this year. Anyone who's been reading Scott Bradner's column in *Network World* knows he couldn't disagree more.

In a special deal with *InfoWorld*, we arranged for Metcalfe and Bradner to square off on the topic in the pages of both publications. You be the judge.

BY BOB METCALFE

The Internet might possibly escape a "gigalapse" this year. If so, I'll be eating columns at the World-Wide Web Conference in April. Even so, Scott Bradner should be concerned about the Internet's coming catastrophic collapses.

"Collapses" are widespread and prolonged Internet outages, which, like powerful tropical storms, get named and tracked.

To size an outage, multiply the number of users times their hours of denied access. A recent BBN Planet "kilolapse" meant thousands of lost user hours. An ampersand mistyped into a router de-'Netted 400,000 Netcom users for 13 hours — a 5.2 "megalapse." Another botched router update de-Webbed 6.2 million America Online users for 19 hours — a catastrophic 118 megalapse.

Now, don't you be confusing megalapses with the bogging down of the Internet. Members of the World-Wide Wait Watchers Club do this. They complain about waiting too long for downloads, too often hitting their "Stop loading" buttons and too seldom getting better service by changing Internet service providers. To them, the bogging down and collapses are the same thing — a growing pain.

Among causes of Internet collapse are traffic jams. Of course, this automobile analogy forgets that when Internet bridges are gridlocked, packets (unlike cars) get dumped into the river. The 10% packet loss that caught my attention last December now sometimes exceeds 40%.

Internet retransmission protocols, when widely implemented, multiply packet losses, slow downloads and often sneak quietly away, leaving inexplicable error messages. There's a real danger here of regenerative retransmission collapse.

Overbuilding the Internet to overcome its architectural problems is decreasingly an option. Financial incentives for adding capacity are weak; ISPs struggle to make money. Despite all that dark fiber, actual circuits are harder to come by. Installation delays on 4M bit/sec backbone circuits, for example, are now stretching out toward 180 days.

Let's be concerned that large portions of the Internet might be brought down, not by nuclear war but by power failures, telephone outages, overloaded domain name servers, bugs in stressed router software, human error in maintaining routing tables and sabotage, to name a few vulnerabilities.

Because the Internet's early builders believed that it defies management — it's alive! — they punted, leaving no organized process for managing Internet operations. Where, for example, are circuits inventoried, traffic forecasts consolidated, outages reported, and upgrades analyzed and coordinated? The Internet Engineering and Planning Group and the North American Network Operators Group are by most accounts no-ops, meaning they do nothing.

But the Internet is not alive. It's actually a network of computers. And somebody — hopefully cooperating ISPs — should be managing its operations.

The Internet Engineering Task Force now seems to be coming around. It just reorganized itself to create an Operations and Management (O&M) Area. Scott Bradner should be reelected to lead O&M and to organize ISP processes for cooperative operational management.

Now, some say I'm a control freak, that we should let competition in the free market save us from Internet catastrophe. Excuse me, but pundits whining their concerns, buyers getting informed and competing service providers better organizing their cooperations are all good examples of exactly how this free market thing works. If we get ISPs cooperating on operations soon, maybe our growing governments and their telephone monopolies won't need to step in to save the Internet's day.

Metcalfe invented Ethernet in 1973 and founded 3Com Corp. in 1979. He receives E-mail at bob_metcalfe@infoworld.com.

BY SCOTT BRADNER

The sky is not about to fall. One of the most common reactions in the press — and to some degree, the technical community — to Bob Metcalfe's predictions of the impending collapse of the Internet, has been to treat him as a Chicken Little — running around in circles loudly lamenting the end of civilization as we know it.

It is a nice, simple concept, easy for the press and public to understand — the Internet will be toast by Tuesday (or was that Thursday). But there are two things wrong with the story. First, it is effectively impossible for the global Internet to fail in a catastrophic way. Second, Bob talks about problems that might affect large numbers of users — not quite the same thing as a systemic collapse.

The Internet consists of hundreds of thousands of interconnected networks, each under its own management. Most of these networks are within end-user organizations and thousands of small Internet service providers. In addition, there are a few dozen large ISPs, each with a service area spanning geographic regions and, in some cases, national borders.

This structure is a more richly endowed version of the global telephone network structure. (Note that with the global trend toward telecommunications deregulation, the structure of the global telephone network is getting to look more like the fragmented Internet.)

Is a systemic collapse of such a system possible? No, but some pundits try to claim it is. They come up with nightmare scenarios where all the ISPs get routing updates that their routers see as some form of death pill, or all ISP routers are simultaneously sabotaged by some evil force. Some pundits even point to the meltdown of the telephone switch signaling protocols a few years back as evidence that the same kind of thing could happen to the Internet.

Is systemic collapse probable? No. The Internet is far too diverse these days.

I do have to agree with Bob that there will continue to be vendor- and facility-specific outages. As some of the vendors continue to expand their customer bases, the effect of outages will grow (megalapses, if you will). But how do these outages compare with these experienced by other service providers? A few months ago, a major failure of the power grid left most of the western U.S. trying to communicate by candlelight. And on an average day, more than 30,000 people in the U.S. are without telephone service for an average of five hours each (visit http://www.atis.org/atis/nrsc/whatsne2.htm). Yet no one points to an impending failure of the power or telephone systems.

There is a problem in that many of the existing ISPs are undercapitalized or do not have adequately trained staff. You can expect such vendors to experience episodic overloads, resulting in slow or unreliable service. But, just as I changed my telephone long-distance provider when I had trouble getting calls through because of overloaded lines, I expect users will change ISPs if they are getting poor quality service.

Bob has been engaging in more than a little bit of hyperbole to try to get the attention of the ISPs, but what I find far more troubling than Bob's message is the way it has been simplified and magnified by many in the press. It's not that the press is trying to create controversy.

Rather, I fear, it's because too few in the press understand the technology they are reporting on. If it all seems chaotic and magical, then it is easy to think that the magic may end.

Disclaimer: Harvard has been on the Internet since before we knew it was the Internet, and the university has seen quite a range of service qualities over the years, but the above are my own opinions.

Bradner is a consultant with Harvard University's Office of Information Technology. He can be reached via the Internet at sob@harvard.edu.

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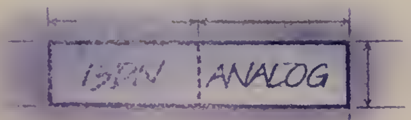

- Separate ISDN and analog ports
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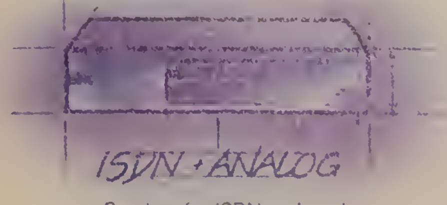

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Circle Reader Service **#37**

REMOTE ACCESS

It's easier than ever to tap in anytime, anywhere

By Mark Miller

n this world of boundless offices, remote LAN access vendors are making it easier than ever to keep roving users, home workers and even business partners linked to enterprise nets.

Over the past year, vendors have more tightly embraced Internet protocols, such as PPP and SLIP, in products that connect remote nodes to LANs as if they were directly attached. They're also making it possible to gain remote access over intranets via Web browsers.

Vendors have likewise added support for a broader mix of remote clients, such as Windows 95 and Windows NT; enhanced user authentication to thwart hackers; started stuffing remote access functions into network operating systems (NOS) to take advantage of stronger security and easier administration; and begun looking for ways to speed up the WAN link, which is typically of the dial-up variety.

At least one vendor, Cubix Corp., has found a way to create different types of remote links depending on the user's application.

As a result, remote access is quickly becoming a commodity that can be made available to just about anyone, anywhere. "Remote access is not just for the branch office or a single department anymore," says Robyn Aber, director of business development at 3Com Corp. "Today's remote access server must address a much larger client community, which has a diversity of end-user requirements."

The growing number of people estab-ishing remote LAN connections has driven vendors to roll out more scalable products that support a significantly arger number of ports and can be more easily integrated with other types of premises equipment, such as hubs.

Before you start searching

There are many types of remote access products from which to choose. For example, there are high-capacity, enterprise-level hardware servers that support just about anything you need. In addition to linking to various LAN types and supporting Internet/intranet access, these units have WAN concentration features that enable you to subscribe to carrier services that groom multiple incoming dial-in calls onto a single, high-speed, dedicated link to your central site.

Then there are mid-range and low-end hardware servers that each support a particular LAN environment and a more limited number of dial-up links. Finally, you've got software-based products that run on top of a NOS, with a capacity limited only by the hardware constraints of the LAN server.

Deciding which type of product is right for you begins by getting a grip on your remote access needs. This requires conducting an inventory of your internetwork.

Included in this inventory should be the types of end users you have — telecommuters, traveling executives or remote office personnel — and a reading of their experience levels with remote access. You also have to tally the different types of client platforms those users have, the protocols on your LAN and the WAN connections you'll need.

Just about any remote access product will work with any client that supports PPP or SLIP, versions of IP that can run over dial-up links.

A fewer number of products natively support clients running other protocols. For instance, Attachmate Corp.'s Remote LAN Node, which was acquired from Digital Communications Associates, Inc., supports almost all the remote clients you might have, including IP, IPX and legacy systems. But the trend toward supporting standard protocols on the client is clear. "Our customers are telling us that they want to migrate to a standards-based remote access infrastructure, built upon IP and PPP," says Bill Berner, networking and communications product manager at Apple Computer, Inc.

Apple, itself, is moving in the standards direction. Its Remote Access Personal Server 2.1 and Remote Access Multiport Server, when coupled with Apple's IP Gateway, support IP, as well as AppleTalk across an AppleTalk Remote Access Pro-

TROY THOMAS

PRODUCT PROFILES

Product type	Enterprise access servers	Remote LAN access servers
Primary functions	Internet access, intranet access, enterprise network access, central site LAN access, leased backup for remote site	Intranet access, central site LAN access, remote site LAN management
WAN side features	Multiple analog dial-up ports, high-speed leased-line ports, frame relay interface, ISDN BRI and PRI interfaces, support for multiple dial-up client protocols and dial-up security protocols	Multiple analog dial-up ports, ISDN BRI interfaces, support for multiple dial-up client protocols and dial-up security protocols
LAN side features	Multiple LAN interfaces, support for multiple transport protocols	One or more LAN interfaces, support for one or more transport protocols
Typical number of ports	30 or more	12 or less
Typical system price	$5,000 to $30,000	$5,000
Target market	Internet service providers, Fortune 500 enterprise network organizations	Corporate departments and workgroups

SOURCE: IN-STAT, INC., SCOTTSDALE, ARIZ.

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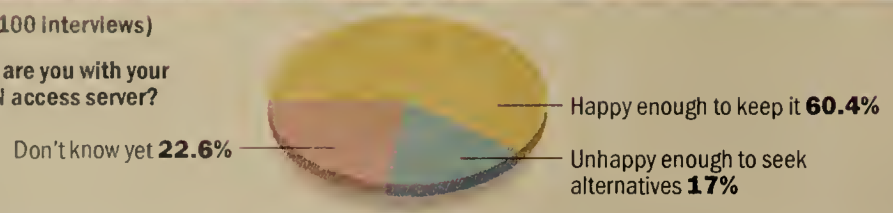
Reader views on remote LAN access servers

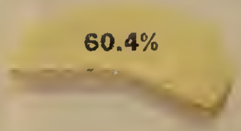
(Based on 100 interviews)

How happy are you with your remote LAN access server?



(Based on responses from 53 users with experience)

Why did you say that?



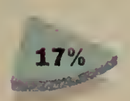
Happy enough to keep it

"It does what we need it to do and does it fairly efficiently."

"We evaluated it for nine months, and it does everything we need. It also has expansion capability with an open-slot design."

"Because of stability. The uptime is darn good. The server has never crashed. It has error-correcting RAM. Plus, I like the dual processing ability and the dual power supplies."

"It appears to work fairly well and has new access options, including ISDN. It also interfaces with third-party security products."

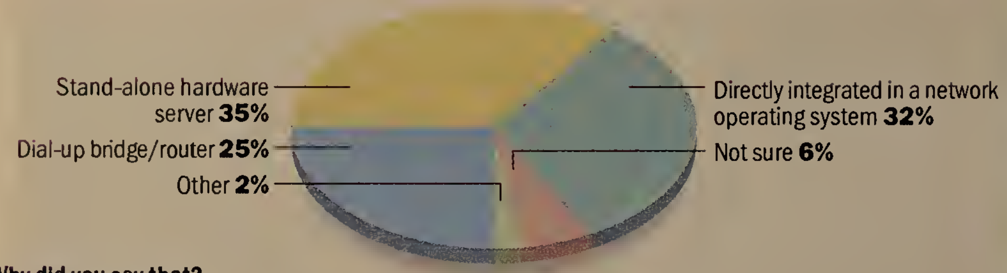


Unhappy enough to seek alternatives

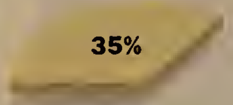
"It was not a smooth implementation. There is no ease of use from the end user's standpoint. It's too complex."

"It is a little hard to administer, and there are some client issues."

What one way do you prefer to implement remote LAN access?



Why did you say that?



Stand-alone hardware server

"File servers have enough activity as it is and should not have to handle this extra processing load."

"Ours gave us several options, possibly things that routers don't do yet."

"Too many things can go wrong in a NOS. So, by isolating remote access, we can deal with it separately."

Directly integrated in a NOS

"It is all integrated into the NOS, which makes management easier."

"Each way has pros and cons, but ultimately, we'd like it fully integrated."

"It is easier to maintain the whole system when everything is integrated. This way you don't have different hardware, each with its own operating system to learn."

"We have had all three in the past. Running it directly in the NOS is more reliable."

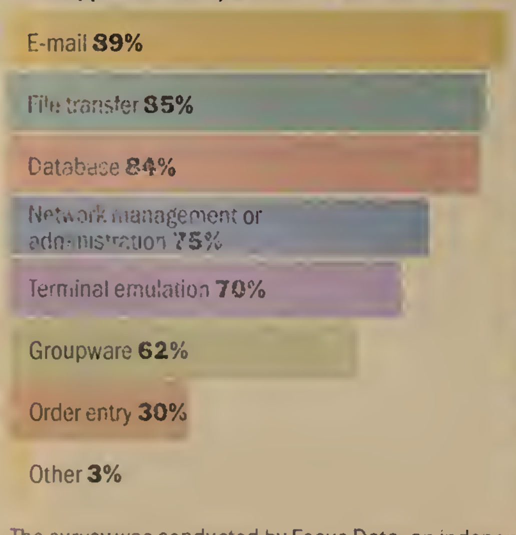
Dial-up bridge/router

"Because of security, and it's modular so we can add as needed and not interfere with other traffic."

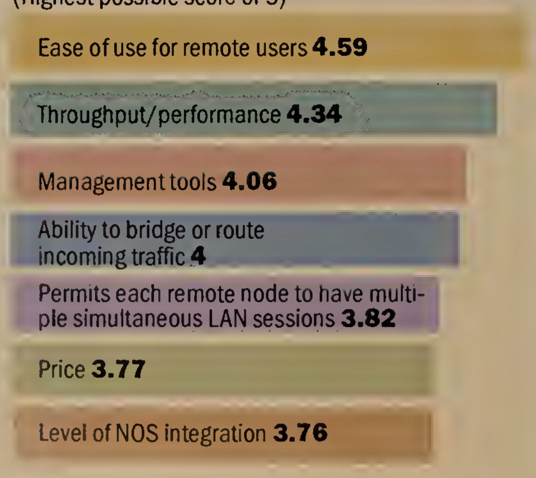
"Because it's reliable, and the technology is mature."

"Because of the low cost. Plus, it's pretty basic to install and consistent."

What applications do/will remote users access?



How important are these factors in selecting a remote LAN access server?
(Highest possible score of 5)



The survey was conducted by Focus Data, an independent market research firm in Framingham, Mass., that gathers primary data concerning the enterprise network environments and needs of end users. To purchase full survey results, call Mona Dabbon at (508) 626-2556, or send E-mail to mdabbon@focusdata.ultranet.com.

tocol connection. On the client side, Apple's Internet Connection Kit for MacOS 7.5 has a PPP client plus a number of tools to facilitate 'Net connections. In the future, Apple plans to expand its remote access support to incorporate both IP and AppleTalk over PPP.

Simplifying the client connection

The bigger questions revolve around the experience level of the remote users and what those users want to accomplish over the remote access connection.

"Users approach the remote access challenge with differing application requirements, and the choices between access technologies — dial-up, ISDN or even an Internet service provider — further complicates the issue," says Tim McShane, senior product-line manager at Cisco Systems, Inc. "And end users come with differing levels of experience, which presents an additional challenge in terms of remote-user support."

SOFTWARE-ONLY SERVERS

Of the more than 80 products listed in the chart starting on page 78, 12 are software-only offerings. Here are the products and the operating systems they run on:

- Apple's Remote Access Multiport Server 2.1 and Remote Access Personal Server running under MacOS
- Attachmate's Remote LAN Node running under a proprietary 32-bit multitasking operating system
- Banyan's Remote LAN Node for StreetTalk 4.1 running under the VINES NOS
- Citrix's WinFrame/Enterprise running under Windows NT Server
- Digi International's Integrated Solutions for NetWare running under NetWare and Integrated Solutions for Windows NT running under Windows NT Server
- Funk Software's WanderLink running under NetWare
- Microsoft's Remote Access Services running under Windows NT Server
- Multi-Tech's MultiCom RN-Gateway RN108 Miniarray running under Windows 3.X or Windows for Workgroups
- Novell's NetWare Connect 2.0 running under NetWare
- Telepartner International's RemoteVision running under OS/2 Warp

Integrating remote access into a corporate intranet can simplify the connection process for inexperienced users. Instead of having to learn how to run a remote node client application, the end user would fire up a browser, point it at an intranet URL, click and get connected to a central resource. This intranet approach can also lower costs because traffic is shuttled across the Internet instead of over more expensive dial-up lines. That, however, does raise reliability and security issues that you will have to address.

Vendors are taking other steps to address the complexity issue, most notably making remote node client software easier to install and use. "One of 3Com's objectives is for the client side of a remote access system to be very intuitive to install — something that can be easily accomplished in under 15 minutes," Aber says.

The end user should be able to connect the network interface device, such as a modem, run a cable to the computer and install the client software with just a few mouse clicks. End users should also be required to enter only the most basic information, such as the central site telephone number, Aber says.

For more advanced end users, Cisco attempts to satisfy a variety of client requirements, including the ability to establish remote control or remote node connections over various types of WAN links in its CiscoRemote Plus client software. The software supports all the protocols necessary for dial-up or ISDN connections to corporate LANs or ISPs from a Windows-based workstation.

Cisco integrated a number of client applications within CiscoRemote Plus, including Netscape Communications Corp.'s Navigator 2.0 Web browser, Databeam Corp.'s FarSite Collaborative Computing and Conferencing Software, Coordinate.com's BeyondMail and Farallon Computing, Inc.'s Timbuktu remote control software. There are also TCP/IP utilities such as telnet, ping and File Transfer Protocol.

Applications by the rules

Cisco is not alone in providing both remote control and remote node support in client software. "Within the last year or so, we have seen the blending of those two camps," says Jim Zakzeski, vice president of marketing at Cubix. "Experience has shown that there are certain applications that work best in each environment." However, he says, end users may not always be able to tell when one method is better.

That is why Cubix developed WorldDesk, a modular enhancement for the Citrix WinFrame remote access server, software supplied with its WorldDesk Commuter.

Once connected to the central site server, WorldDesk examines what application the user is requesting access to and chooses the type of connection — remote control or remote node — that will provide the best performance. For example, a net manager can establish a rules-based database at the central site that will detect when users request access to an application that requires central processing for greatest efficiency, and make sure they ge a remote control connection. If during the same session the user requests acces to data for applications running on a laptop, the server changes the connection to remote node.

Never fast enough

Even with such processing advancements, there is a set of remote users with ever-higher expectations for remote access. Essentially, these users got spoiled with high-speed corporate networks which can deliver tens or even hundred of megabits per second of bandwidth to the desktop.

Using the corporate network as th benchmark, these remote users hav

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The landscape of remote access is changing and Colorado is equipped to handle the most demanding twists and turns. It is available with an Ethernet or Token Ring LAN interface and supports three WAN connections and an optional ISDN Basic Rate Interface. Another model, Colorado Plus, supports all the features of the Colorado but includes two Ethernets or an Ethernet and a Token Ring interface.

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Circle Reader Service #42

REMOTE LAN ACCESS SERVERS

Company	Product	Max. no. of ports	Network operating systems					WAN interfaces					Dial-up protocols	Protocols routed					Features		Security							Mgmt. agents		Price
		L=LAN W=WAN	AppleTalk	NetWare	OS/2 Warp server	VINES	Windows NT Server	Analog dial-up	Fractional T-1/T-1	Frame relay	ISDN	Other		Apple Talk	IPX	TCP/IP	VINES IP	Other	Max. number of LAN sessions	Data compression ratio	CHAP	Dial-back	Password encryption	PAP	RADIUS	TACACS	Other	Proprietary	SNMP	
Apple Computer, Inc. (800) 544-8554	Remote Access Multiport Server	L: 1 W: 16	●	●		●	●	●			BRI	CDPD, circuit-switched cellular	ARAP	●		●			16			●	●				●		v1	$799 (1)
	Remote Access Personal Server 2.1	L: 1 W: 1	●	●		●	●	●			BRI	CDPD, circuit-switched cellular	ARAP	●		●			1			●	●						v1	$189
Ascend Communications, Inc. (800) 272-3634	Max 200 Plus	L: 1 W: 8	●	●			●	●			BRI	Circuit-switched cellular	ARAP, MPPP, PPP, proprietary, SLIP	●	●	●			8	4:1	●	●	●	●	●	●	●	●	v1	$2,400-$4,200
	Max 1800	L: 1 W: 16	●	●			●	●		●	BRI	Circuit-switched cellular	ARAP, MPPP, PPP, proprietary, SLIP,	●	●	●			16	4:1	●	●	●	●	●	●	●	●	v1	$6,400-$18,400
	Max 2000	L: 1 W: 25	●	●			●	●	●	●	PRI	Circuit-switched cellular	ARAP, MPPP, PPP, proprietary, SLIP	●	●	●			25	4:1	●	●	●	●	●	●	●		v1	$6,500-$19,000
	Max 4002	L: 1 W: 49	●	●			●	●	●	●	BRI, PRI	Circuit-switched cellular, switched digital	ARAP, MPPP, PPP, proprietary, SLIP	●	●	●			49	4:1	●	●	●	●	●	●	●	●	v1	$11,000-$36,000
	Max 4004	L: 1 W: 97	●	●			●	●	●	●	BRI, PRI	Circuit-switched cellular, switched digital	ARAP, MPPP, PPP, proprietary, SLIP	●	●	●			97	4:1	●	●	●	●	●	●	●	●	v1	$15,500-$55,500
	Max TNT	L: 16 W: 672	●	●			●	●	●	●	BRI, PRI	Circuit-switched cellular, switched digital	ARAP, MPPP, PPP, proprietary, SLIP	●	●	●			672	4:1	●	●	●	●	●	●	●	●	v1	$18,750-$468,650
Attachmate Corp. (800) 426-6283	Remote LAN Node	L: (3) W: (3)	●	●	●	●	●	●	●		BRI, PRI	Switched digital, X.25	ARAP, PPP, proprietary	●	●	●	●	●	32	4:1	●	●	●	●		●			v1	$985-$15,835
	Remote LAN Node Access Server	L: 32 W: 32	●	●	●	●	●	●	●		BRI, PRI	Switched digital, X.25	ARAP, PPP, proprietary	●	●	●	●	●	32	4:1	●	●	●	●		●			v1	$4,575-$17,935
Banyan Systems, Inc. (800) 222-6926	Remote LAN Node for StreetTalk 4.1	L: (3) W: (3)				●		●			BRI, PRI	CDPD, circuit-switched cellular, switched digital	ARAP, PPP		●	●	●		32	4:1	●	●	●	●					v1	$3,195
Bay Networks, Inc. (800) 822-9638	Clam	L: 1 W: 1		●		●	●				BRI		MPPP, PPP, proprietary		●	●			23	4:1	●		●	●						$1,195-$2,695
	Marlin	L: 1 W: 3		●		●	●				BRI, PRI		MPPP, PPP, proprietary		●	●			23	4:1	●		●	●	●					$1,995-$7,995
	Remote Annex 6100	L: 1 W: 24	●	●			●	●	●			Channelized T-1	ARAP, PPP, SLIP		●			●	24		●	●	●	●	●					$19,995-$24,995
	Remote Annex 6300	L: 1 W: 24	●	●			●	●			PRI		ARAP, PPP, SLIP,		●	●			24		●	●	●	●	●					$9,995-$30,995
Cabletron Systems, Inc. (603) 332-9400	CSX6000	L: 2 W: 180	●	●	●	●	●	●	●	●	BRI, PRI	Dedicated, switched digital, X.25	ARAP, MPPP, PPP, proprietary, SLIP	●	●	●			500	4:1	●	●	●	●	●	●	●	●	v1, v2	$14,000-$36,000
	CSX7000	L: 4 W: 360	●	●	●	●	●	●	●	●	BRI, PRI	Dedicated, switched digital, X.25	ARAP, MPPP, PPP, proprietary, SLIP	●	●	●			500	4:1	●	●	●	●	●	●	●	●	v1, v2	$28,000-$42,000
Cayman Systems, Inc. (800) 473-4776	Marina 130	L: 1 W: 3	●				● (2)	●			BRI, PRI	SMDS, spread spectrum, switched digital	PPP	●		●			No limit		●			●				●		$995
Cisco Systems, Inc. (408) 526-4000	2511	L: 1 W: 16	●	●	●	●	●	●	●	●		Switched digital, SMDS, X.25	ARAP, PPP, proprietary, SLIP	●	●	●	●	●	16		●	●	●	●	●	●	●	●	v1, v2	$2,095-$3,295
	AS5200	L: 1 W: 4	●	●	●	●	●	●	●	●	PRI	Switched digital, SMDS, X.25	ARAP, PPP, proprietary, SLIP	●	●	●	●	●	60	4:1	●	●	●	●	●	●	●	●	v1, v2	$37,500
Citrix Systems, Inc. (800) 437-7503	WinFrame/ Enterprise	L: (3) W: (3)		●	●		●	●	●	●	BRI, PRI	CDPD, spread spectrum, switched digital, SMDS	MPPP, PPP, proprietary, SLIP		●	●		●	15	3:1	●	●	●	●						$5,995
CommVision Corp. (800) 832-6526	CommSwitch RLN	L: 10 W: 320	●	●	●	●	●	●	●	●	BRI, PRI	X.25	PPP, proprietary	●	●	●	●		320	4:1	●	●	●	●		●	●		v2	$25,325-$163,495
	CommSwitch 2500 for NWC	L: 10 W: 320	●	●	●		●	●	●	●	BRI	X.25	PPP, proprietary	●	●	●		●	320	4:1	●	●	●	●			●		v2	$20,380-$132,495
Cubix Corp. (800) 829-0550	WorldDesk Commuter	L: 12 W: 12		●			●	●			BRI		PPP		●	●	●	●	12	4:1	●	●	●	●			●			$1,995-$5,795
Digi International, Inc. (612) 912-3444	Integrated Solutions for NetWare	L: (3) W: (3)		●				●		●	BRI, PRI		ARAP, MPPP, PPP, SLIP	●	●	●			256		●	●	●	●						$872-$8,146
	Integrated Solutions for Windows NT	L: (3) W: (3)					●	●		●	BRI, PRI		MPPP, PPP, SLIP			●			256		●	●	●	●						$1,290-$1,795
	LANA System	L: 1 W: 10		●	●	●	●	●			BRI		PPP		●	●	●	●	10		●	●	●	●	●	●	●	●	v2	$1,695-$7,795
Digital Equipment Corp. (800) 457-8211	NetRider Family	L: 1 W: 32	●	●				●					PPP, SLIP	●	●	●			256		●	●	●	●	●		●	●	v1	$2,040-$4,915
Digital Products, Inc. (800) 243-2333	NetCommuter	L: 1 W: 1	●	●		●	●	●			BRI		ARAP, PPP, proprietary	●	●	●			1	4:1	●	●	●	●						$645
Emulex Corp. (800) 368-5391	ConnectPlus LT	L: 1 W: 2	●	●	●		●	●			BRI		ARAP, PPP, proprietary, SLIP	●	●	●			2		●	●	●	●				●	v1	$899
	ConnectPlus Pro	L: 1 W: 10		●			●	●			BRI		PPP		●	●			10		●	●	●	●			●	●	v1, v2	$2,895-$3,395
Eversys Corp. (415) 879-8888	CAPserver & System 8000	L: 128 W: 8	●	●	●		●	●	●	●	BRI, PRI		ARAP, MPPP, PPP, proprietary	●	●	●		●	128	4:1	●	●	●	●	●		●		v1	$4,499-$8.799
Funk Software, Inc. (800) 828-4146	WanderLink	L: (3) W: (3)		●				●			BRI, PRI		PPP	●	●	●			64	4:1	●	●	●	●			●			$295-$2,595
Gandalf Systems Corp. (800) 426-3253	XpressStack BRI	L: 1 W: 16	●	●	●	●	●		●		BRI		MPPP, PPP, proprietary			●	●		2,000	8:1	●		●	●	●	●	●	●	v1	$6,995
	XpressStack PRI	L: 1 W: 23	●	●	●	●	●		●		PRI		MPPP, PPP, proprietary			●	●		2,000	8:1	●		●	●	●	●	●	●	v1	$10,500
	XpressStack IAS	L: 1 W: 46	●	●	●	●	●	●	●		BRI, PRI		MPPP, PPP, proprietary			●	●		2,000		●		●	●	●	●	●	●	v1, v2	Not available

Product names highlighted in color were selected for the Short List.

CHART COMPILED BY KATHY SCOTT

Footnotes (1) Requires host Macintosh (2) If using TCP IP (3) Dependent on hardware device (4) Lease price is $59.95; purchase price is $62,575. ADSL = Asymmetric Digital Subscriber Line ARAP = AppleTalk Remote Access Protocol BRI = Basic Rate Interface CDPD = Cellular Digital Packet Data CHAP = Challenge Handshake Authentication Protocol MPPP = Multilink PPP PAP = Password Authentication Protocol PRI = Primary Rate Interface TACACS = Terminal Access Controller Access Control System

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REMOTE LAN ACCESS SERVERS

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		L=LAN W=WAN	AppleTalk	NetWare	OS/2 Warp server	VINES	Windows NT Server	Analog dial-up	Fractional T-1/T-1	Frame relay	ISDN	Other		Apple Talk	IPX	TCP/IP	VINES IP	Other	Max. number of LAN sessions	Data compression ratio	CHAP	Dial-back	Password encryption	PAP	RADIUS	TACACS	Other	Proprietary	SNMP	
Gandalf Systems Corp. (800) 426-3253	Xpressway RLAN	L: 2 W: 240	●	●	●	●	●	●	●	●	BRI, PRI	Switched digital	MPPP, PPP, proprietary			●			2,000	8:1	●		●	●	●	●	●	●	v1, v2	$15,900-$120,000
IBM (800) 426-2255	8235-I40 Dial-In Access to LANs Switch	L: 1 W: 3	●	●	●		●	●	●		BRI, PRI	Circuit-switched cellular, switched digital	ARAP, MPPP, PPP, SLIP	●	●	●	●	●	72	4:1	●	●	●	●	●	●	●	●	v1,	$24,370-$93,685
Lantronix (800) 422-7055	LRS1	L: 1 W: 1		●			●	●			BRI		MPPP, PPP, SLIP		●	●			1		●	●	●	●	●		●	●	v1, v2	$545
	LRS2	L: 1 W: 2		●			●	●			BRI		MPPP, PPP, SLIP		●	●			2		●	●	●	●	●		●	●	v1, v2	$995
	LRS16	L: 1 W: 16		●			●	●			BRI		MPPP, PPP, SLIP		●	●			16		●	●	●	●	●		●	●	v1, v2	$2,495
LeeMah DataCom (888) 253-3624	BandWagon	L: 1 W: 42		●		●	●	●	●		BRI, PRI		MPPP, PPP		●			●	42		●	●	●	●	●	●	●		v2	$5,800-$20,000
Livingston Enterprises, Inc. (510) 426-0770	PortMaster 2	L: 1 W: 10					●	●				Switched digital	PPP, SLIP		●				10		●	●	●	●	●			●	v1, v2	$2,495
	PortMaster 2E	L: 1 W: 30		●	●		●	●		●	BRI,	Switched digital	MPPP, PPP, SLIP		●	●			30		●	●	●	●	●			●	v1, v2	$2,695-$7,885
	PortMaster 2ER	L: 1 W: 31		●	●		●	●	●	●		Switched digital	MPPP, PPP, SLIP		●	●			31		●	●	●	●	●			●	v1, v2	$3,495-$7,485
	PortMaster 2i	L: 1 W: 10		●	●		●	●			BRI		MPPP, PPP, SLIP		●	●			10		●	●	●	●	●			●	v1, v2	$3,495
	PortMaster 2R	L: 1 W: 11		●	●		●	●	●	●		Switched digital	MPPP, PPP, SLIP		●	●			11		●	●	●	●	●			●	v1, v2	$3,295
	PortMaster 3	L; 1 W: 2		●	●		●	●	●	●	PRI		MPPP, PPP, SLIP		●				2		●	●	●	●	●			●	v1, v2	$9,950-$30,650
Metricom, Inc. (888) 466-9473	Ricochet IP Gateway	L: 1 W: 1										Spread spectrum	PPP, SLIP			●		●	300		●		●	●		●	●	●		(4)
Microcom, Inc. (800) 822-8224	LANexpress 4000	L: 1 W: 12	●	●		●	●	●			BRI	CDPD	ARAP, PPP		●	●		●	12	4:1	●	●	●	●			●		v1	$4,995
Microsoft Corp. (800) 426-9400	Windows NT Server 4.0	L: (3) W: (3)		●	●		●	●	●	●	BRI, PRI	ATM	MPPP, PPP, proprietary, SLIP		●	●			No limit	8:1	●	●	●	●				●		$809
Motorola, Inc. (508) 261-4000	925 AccessWay System	L: No limit W: No limit	●	●	●	●	●	●	●	●	BRI, PRI	Circuit-switched cellular, switched digital	ARAP, MPPP, PPP, SLIP	●	●	●			No limit	4:1	●	●	●	●	●	●	●	●	v1, v2	$37,995-$74,450
Multi-Tech Systems, Inc. (800) 328-9717	MultiCom RN-Gateway RNI08/ Miniarray	L: 8, 16 W: 8, 16		●				●	●	●	BRI, PRI		PPP		●	●			16	4:1	●	●		●				●		$3,095-$3,995
Netaccess, Inc. (800) 950-4736	Instant RAS Family	L: 2 W: 64		●			●	●			BRI, PRI		MPPP, PPP		●	●			64	8:1	●	●		●	●			●		$1,799-$6,398
Northern Telecom, Inc. (800) 466-7835	Rapport Dial-up Switch	L: 18 W: 24	●	●	●			●		●	PRI	Circuit-switched cellular	ARAP, MPPP, PPP, SLIP	●	●	●			72	4:1	●	●		●	●	●	●	●	v1	$11,900-$65,400
Novell, Inc. (800) 638-9273	NetWare Connect 2.0	L: (3) W: (3)	●	●				●			BRI, PRI		ARAP, PPP, proprietary	●	●	●			128		●	●	●	●					v1	$395-$4,495
Penril Datability Networks (301) 921-8600	AB1000/RA	L; 1 W: 16	●	●			●	●			BRI		ARAP, PPP, SLIP	●	●	●			16		●	●		●	●	●	●	●	v1	$1,695-$3,995
	AB 2400	L: 1 W: 32	●	●			●	●			BRI		ARAP, PPP, SLIP	●	●	●			32		●	●		●	●	●	●	●	v1	$1,995-$11,500
	Remote Access Modem Rack	L: 1 W; 32	●	●			●	●			BRI		ARAP, PPP, SLIP	●	●	●			32		●	●		●	●	●	●	●	v1 v1	$1,495-$23,475
Perle Systems, Inc. (800) 467-3753	833	L: 1 W: 8	●	●			●	●					ARAP, PPP		●	●			8	4:1	●	●		●					v1	$1,795-$3,750
RAD Data Communications, Inc. (201) 529-1100	MBE-8D Ethernet Multiport Remote Access Server	L: 1 W: 2		●	●	●	●	●	●	●	BRI	Switched digital	MPPP, PPP, proprietary, SLIP		●	●	●	●	250	4:1	●	●	●	●				●	v1, v2	$1,250
	MBE-RAS	L: 1 W: 8		●	●	●	●	●	●	●	BRI	Switched digital	MPPP, PPP, proprietary, SLIP		●	●	●	●	250	4:1	●	●	●	●				●	v1, v2	$2,400+
	RADring	L: 1 W: 20		●	●	●	●	●	●	●	BRI	Switched digital	MPPP, PPP, proprietary, SLIP		●	●	●	●	250	4:1	●	●	●	●				●	v1, v2	$700-$4,000
	TRE-8D	L: 1 W: 2		●	●	●	●	●	●	●	BRI	Switched digital	MPPP, PPP, proprietary, SLIP		●	●	●	●	250	4:1	●	●	●	●				●	v1, v2	$1,750
	TRE-RAS	L: 1 W: 8		●	●	●	●	●	●	●	BRI	Switched digital	MPPP, PPP, proprietary, SLIP		●	●	●	●	250	4:1	●	●	●	●				●	v1, v2	$2,800+
RNS, an Osicom Technologies cmpany (800) 262-8023	NetHopper NH-BRI 600 Series	L: 1 W: 3		●	●		●	●			BRI		MPPP, PPP		●	●			No limit	4:1	●	●	●	●	●		●		v1	$895-$3,795
	NetHopper NH-RAS Remote Access Servers	L: 1 W: 5		●	●		●	●					PPP		●	●			No limit	4:1	●	●	●	●	●		●		v1	$1,295-$2,995

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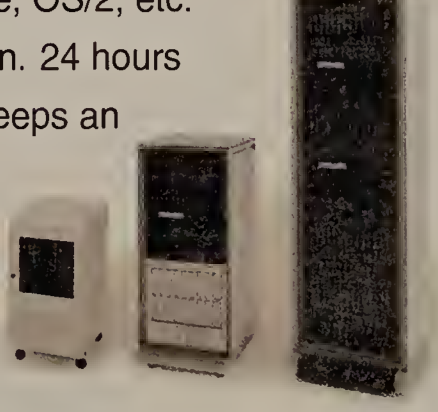

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REMOTE LAN ACCESS SERVERS

Company	Product	Max. no. of ports	Network operating systems					WAN interfaces					Dial-up protocols	Protocols routed					Features		Security							Mgmt. agents		Price
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Shiva Corp. (800) 977-4482	LanRover Access Switch	L: 1 W: 3	●	●	●	●	●		●		PRI		ARAP, MPPP, PPP, proprietary, SLIP	●		●			78	4:1	●	●	●	●	●	●	●		v2	$23,000-$57,000
	LAN Rover Family	L: 1 W: 8	●	●	●	●	●	●			8RI		ARAP, MPPP, PPP, proprietary, SLIP	●	●	●			8	4:1	●	●	●	●	●	●	●		v2	$3,200-$9,000
Symplex Communications Corp. (313) 995-1555	DirectRoute DR-1 BRI/PRI	L: 2 W: 6/3	●	●	●	●	●		●	●	BRI, PRI	Switched digital	MPPP, PPP, proprietary		●	●			No limit	8:1	●	●	●	●	●	●	●		v1	$2,999-$4,999
Telepartner Intenational (800) 935-3270	RemoteVision	L: (3) W: (3)		●	●	●	●	●				Circuit-switched cellular, X.25	Proprietary		●	●	●	●	64	3:1			●							$9,100
3Com Corp. (800) 638-3266	AccessBuilder 2000 Remote Access Server 6.2	L: 1 W: 8	●	●	●	●	●	●					ARAP, MPPP, PPP, SLIP	●	●	●			8	4:1	●	●		●	●	●	●		v1, v2	$2,795-$3,895
	AccessBuilder 4000 Remote Access Server 6.2	L: 1 W: 16	●	●	●	●	●	●			8RI		ARAP, MPPP, PPP, SLIP	●	●	●			16	4:1	●	●		●	●	●	●		v1, v2	$2,495-$10,485
	AccessBuilder 5000 LAN/WAN Switch	L: 10 W: 368	●	●	●	●	●	●			PRI	Channelized T-1/E-1	ARAP, MPPP, PPP, SLIP	●	●	●			368		●	●		●	●	●	●		v1, v2	$24,995-$110,000
	AccessBuilder 7000 Access Concentrator	L: 12 W: 92		●	●	●	●			●	8RI, PRI		MPPP, PPP, proprietary, SLIP		●	●			92	4:1	●		●	●	●		●	●	v1	$18,865-$53,315
Trancell Systems, Inc. (888) 493-2726	WebRamp IP Router	L: 8 W: 2			●		●				BRI		MPPP, PPP			●			50+	1:1	●		●	●						$899
	WebRamp IPX Gateway	L: 8 W: 2		●	●		●				8RI		MPPP, PPP		●	●			50	1:1	●		●	●						$1,499
U.S. Robotics (800) 877-2677	NetServer 8 and 16 Family	L: 1 W: 8, 16		●			●	●				x2 (56K bit/sec)	PPP		●	●			8, 16	4:1	●	●	●	●	●			●	v1	$4,495-$8,495
	NetServer I-Modem 8 and 16 Family	L: 1 W: 8, 16		●			●	●			8RI	x2 (56K bit/sec)	MPPP, PPP			●		●	8, 16	4:1	●	●	●	●	●			●	v1	$8,995-$13,995
Webster Computer Corp. (408) 353-5252	MultiPort/LT	L: 5 W: 4	●	●		●	●	●			BRI		ARAP	●		●		●	4	4:1		●	●					●	v1	$1,995
Whittaker Xyplex (800) 338-5316	MaxServer Access Server Family	L: 3 W: 250	●	●			●	●	●	●	BRI, PRI	ATM	ARAP, MPPP, PPP, proprietary, SLIP	●	●	●		●	2,240	2-4:1	●	●	●	●	●		●	●	v1	$1,995-$40,000
ZyXel Communications, Inc. (714) 693-0808	Prestige 128 ISDN Remote Access Router	L: 1 W: 1	●	●	●		●	●			8RI		ARAP, MPPP, PPP	●	●	●			1	2-2.5:1	●	●		●			●		v1	$799
	Prestige 2864I	L: 1 W: 1	●	●	●		●	●			BRI		ARAP, MPPP, PPP	●	●	●			1	2-2.5:1	●	●		●			●		v1	$1,099-$1,399

Product names highlighted in color were selected for the Short List.

CHART COMPILED BY KATHY SCOTT

Footnotes: (1) Requires host Macintosh (2) If using TCP/IP (3) Dependent on hardware device (4) Lease price is $59.95; purchase price is $62,575. ADSL = Asymmetric Digital Subscriber Line ARAP = AppleTalk Remote Access Protocol BRI = Basic Rate Interface CDPD = Cellular Digital Packet Data CHAP = Challenge Handshake Authentication Protocol MPPP = Multilink PPP PAP = Password Authentication Protocol PRI = Primary Rate Interface TACACS = Terminal Access Controller Access Control System

come to expect that same level of performance and responsiveness through an access device. As a result, vendors have added support for a number of higher speed WAN connections, including ISDN Basic Rate Interface and Primary Rate Interface, frame relay and Asymmetric Digital Subscriber Line.

REMOTE CONTROL VS. REMOTE NODE

The grandfather of remote access products is remote control, which enables remote workstations to run applications on a central site LAN node by sending keystrokes and getting screen updates over a wide-area connection. Remote control still makes sense for processing-intensive applications such as database queries where a powerful central site workstation can find requested data faster and more efficiently than a remote laptop.

Remote control programs include Artisoft, Inc.'s CoSession, Norton-Lambert Corp.'s Close-Up and Symantec Corp.'s pcAnywhere.

Even if they can't pump up the line speeds they support, vendors are finding other ways to stuff more information down the pipe. For instance, software vendor Stampede Technologies, Inc. has teamed with remote access server vendors Penril Datability Networks, U.S. Robotics and Whittaker Xyplex to bundle its TurboGold remote node accelerator product with the other vendors' remote server hardware.

TurboGold is a client/server utility designed to increase the performance of file-system applications over a remote node connection. The TurboGold client software runs at the remote node location, with the TurboGold Verifier software running at the central site. The premise of TurboGold is that remote users tend to repetitively execute File read commands to access the same data. Once data is accessed the first time, TurboGold caches it locally and verifies the integrity of that cached data when it is subsequently accessed. This eliminates redundant file reads across the remote link, thus minimizing traffic and maximizing end-user throughput.

"Our test results show that by using TurboGold, there is a 200% to 400% increase in throughput of file-based applications," says David Flournoy, Stampede's vice president of sales and marketing. He says using TurboGold in a remote node connection would increase the performance of a Microsoft Access database as much as six times and the performance of Lotus Development Corp.'s cc:Mail almost as much as eight times.

Keeping it secure

Of course, with so many remote users accessing data, you need to make sure there are no security breaches. "Remote access security is best described in terms of the three a's: authentication, authorization and accounting," says Alex Henthorn, product manager for security products at Livingston Enterprises, Inc. Authentication is the process of identifying the remote user or the source of information. Authorization defines where that user is allowed to navigate on the network and the access privileges that user has. Accounting provides an audit trail of events, costs and so on.

Dial-up security protocols, such as the Password Authentication Protocol (PAP) and the Challenge Handshake Authentication Protocol, provide individual pieces of that security puzzle, such as authentication of remote users. These protocols are widely supported. However, Livingston's Remote Authentication Dial-In User Service (RADIUS) protocol, which attempts to tie all three pieces of the puzzle together, continues to gain favor. In fact, more than half the products listed in the Buyer's Guide chart now support RADIUS — more than twice as many as last year (*NW*, Oct. 30, 1995, page 57).

An integrated approach

Tucking remote access capabilities into a NOS can further improve security and make management easier.

"We see a trend toward making the remote access function an integral part o the base operating system, which als incorporates an overall Internet/intrane strategy," says Clyde Morgan, product line manager at Novell, Inc. The compa ny's NetWare Connect 2.0 is a NetWar Loadable Module (NLM) that can lever age the Novell Directory Services and net work administrative features incor porated into NetWare, including logon password and audit capabilities.

NetWare Connect supports bot remote node and remote control for variety of workstations and third-part applications. It also includes several inte grated authentication models, such a

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PAP and third-party challenge-and-response systems.

A clear advantage of such an integrated approach is its ability to be incorporated into a centralized management scheme. NetWare Connect comes with ConnectView, a Windows-based utility that allows the end user to graphically monitor the remote access environment and analyze activities on one or more NetWare Connect servers.

Remote access configuration, link utilization and other statistics are available, as well as the ability to bill back individual departments or users for remote access services.

In addition, unsuccessful logon attempts can be monitored, thus flagging potential security breaches. ConnectView may be incorporated into Novell's ManageWise console as a snap-in application, or integrated into any other industry-standard SNMP console.

There's more data about remote LAN access on Network World Fusion, including:

FIND IT ON 5056 FUSION

- **A chart with additional product details, such as client types supported, LAN types supported and bridging support.**
- **A series of white papers covering remote access over the Internet, using ISDN for remote access and optimizing remote access connections for higher performance.**
- **Links to Web sites devoted to covering telecommuting and other remote access issues in the U.S. and abroad.**

Type the number above into the DocFinder box on the home page.

http://www.nwfusion.com

NetWare Connect can also be integrated as an NLM with IntranetWare, which brings to NetWare a Web server, NetWare IP, a multiport router and a new IPX-to-IP gateway.

Another form of remote access product integration is being undertaken by Northern Telecom, Inc. and Shiva Corp. The firms have teamed up to develop a high-end remote access server that Nortel will market primarily to carriers and large enterprise network users as the Rapport Dial-up Switch (DS) Model 112. Shiva will sell it primarily to corporate users as the LanRover Access Switch.

Both devices share the same hardware platform, although some of the software features are distinct. The Rapport DS 112 is designed with a multiprocessor architecture, reminiscent of the one that came in vogue for high-speed routers a few years ago, says Jim Dondero, product marketing manager at Nortel.

The product dedicates a processor for each 12-port modem card, thus off-loading time-critical tasks from the central CPU.

Performance is further improved via Shiva's enhancement to the code that runs Rockwell International Corp.'s modem chips, as well as the use of call control and optimization algorithms to minimize latency.

Nortel and Shiva have developed a suite of Hewlett-Packard Co. OpenView applications for remote configuration, software upgrade, problem diagnosis and performance management functions. Nortel also developed the Rapport Accountant, an optional application that runs on a RADIUS server to provide per-call accounting records covering a number of areas, such as call duration, number called, protocol type, compression used, line type and amount of data transmitted or received.

The advances made to remote access products over the past year have indeed made it easier to get data from anywhere at any time. In fact, it has reached the point where some forward-thinking companies might steal an idea from America Online and start sending out disks with remote node client software to everyone in the organization.

The service providers, too, could do the same. And the entrance of more providers, including ISPs and cable companies, will make the landscape even more competitive. "The growth potential for the remote access market is extraordinary," says Mark Freitas, executive vice president at Microcom, Inc. "Computing today is not bound by the traditional corporate walls, only by the access to information sources."

Miller is a Network World *contributing editor and president of DigiNet Corp., a Denver-based data communications engineering firm. He is also leading a Network World Technical Seminar, IPv6 — the Next Generation for TCP/IP internetworks. He can be reached a mark@diginet.com.*

NetworkWorld Short LIST

Remote LAN access servers

The Short List highlights products Network World *recommends you examine when shopping for remote LAN access servers. The products mentioned here have inbound ports supporting a mix of multiple WAN services as well as a mix of dial-up protocols. All of these products can meet the needs of users with multivendor enterprise networks. Your needs may differ.*

Ascend Communications, Inc.'s Max family is among the strongest in supporting a wide range of WAN links, including analog dial-up, fractional T-1, T-1, frame relay and ISDN. The family also supports bandwidth management features such as bandwidth on demand and inverse multiplexing, which can reduce overall circuit costs by enabling you to mix remote access and other traffic on a single integrated access link to your carrier. LAN, security and network management support are also strong.

Cisco Systems, Inc.'s AS5200 Access Server illustrates the company's strong suit in handling a wide array of LAN and WAN protocols. The product supports an impressive variety of WAN links, including analog, fractional T-1, switched digital, frame relay, ISDN, Switched Multimegabit Data Service and X.25. Dial-up protocol and security options are also numerous and strong. Cisco additionally offers powerful remote node software that integrates a Web browser, E-mail, remote control and TCP/IP utilities into a single package.

When it comes to integrating remote access into a network operating system, **Novell, Inc.'s NetWare Connect 2.0** is the one to beat. Supplied as a NetWare Loadable Module, the product integrates with either the NetWare or IntranetWare operating systems. This integrated approach provides many advantages, including scalability to as many as 128 sessions on a single server, consolidated network management and support for a variety of NetWare client types.

3Com Corp.'s AccessBuilder family is one of the most scalable on the market, with models supporting everything from a single remote office to an entire enterprise. The family has a flexible architecture — supporting Ethernet and token-ring LANs — and simultaneous support for mixed asynchronous, synchronous, T-1 and ISDN WAN links. 3Com's configuration and network management support are also strong, with a stated objective of a 15-minute or less client installation.

Shiva Corp. and **Northern Telecom, Inc.** have teamed up to market Shiva's technology in two distinct packages. One is Shiva's **LanRover Access Switch,** targeted at the enterprise market. The other is Nortel's **Rapport Dial-up Switch,** focused on the very large enterprise and carrier marketplaces. Both products include a number of processing enhancements that make them scalable, such as additional processors on each modem card — much like the distributed processing architectures found in high-end routers. In addition, management tools are especially strong.

Implementation hints

Providing top-notch remote access services on an enterprise basis requires you to create a single infrastructure that can cater to the whole range of users you're likely to encounter.

"The remote access service level a user can choose is similar to pulling into a gas station and picking full-serve or self-serve, and then selecting regular or premium gas," says Tim McShane, senior product-line manager at Cisco Systems, Inc.

McShane offers some hints on how to make sure you have all the options any end user will require.

At the most basic level, you want to make sure callers can get a connection when they need one. If you are providing access to an Internet or intranet node, you can generally assume you will need one remote access port for every 15 to 30 users. Those users typically dial in, access information and hang up. If they hit a busy signal, they will usually call back a few mintues later without suffering any major productivity loss.

However, if you have got telecommuters that dial in and stay connected for long periods of time while swapping files, accessing E-mail or entering data into a central database, you should have one port for at least every five users. With telecommuters, you want to increase the chance of a user connecting on the first call and staying connected for a long time.

Remote link speed is another issue. Mobile users, periodic Internet accessers and casual telecommuters can get by with standard modems, generally topping out around 28.8K bit/sec.

"Premium users, daily telecommuters and people willing to pay for speed will opt for ISDN lines," McShane says. Other options, such as data compression, can optimize the use of the most critical resource — the WAN link back to headquarters.

If you have got dozens of active dial-in sessions at any given time, you will want to consider working with your carrier to groom incoming dial-up calls onto a high-speed dedicated link into your remote access server. This obviates the need to pay for and manage all those individual dial-up lines at the central site.

"Getting the user connected to a remote access server at a high speed is just the first step," McShane says. "Ensuring that you can provide that speed all the way to the information they want is another."

Many remote access products, especially high-end devices, will provide configuration tools that enable you to perform traffic shaping and traffic prioritization. This lets you determine what traffic must get through, such as real-time datastreams or an SNA session, before anything else. "The key to making this happen is to use remote access server and router tools to provide for traffic management by user, session type, protocol type or other qualifiers," McShane says.

— Mark Miller

Backup: Network's unsung hero

These four enterprise backup solutions can save the day when users losing data are knocking down your door.

By Howard Marks

At first blush, backup seems the simplest of network management tasks. A backup program just has to copy data from your server's disks to a removable medium, right?

Unfortunately, backing up a modern enterprise network isn't that easy. You have servers using different network operating systems on the same net, running 7x24 applications, and there are database and messaging servers that keep their files open all the time, impeding concurrent backup.

To determine how well the current crop of products stand up to the challenge, we looked at backup software that can run on both Windows NT and NetWare servers, and is capable of backing up Unix, Windows NT and NetWare servers along with Windows 3.X, Windows NT and Windows 95 workstations.

Cheyenne Software, Inc.'s ARCserve was our top pick for administrators who are comfortable with conventional backup programs because of its variety of groupware and database agents. Seagate Software, Inc.'s Backup Exec, however, is a strong second. We liked Seagate's higher end product, Storage Manager, for large organizations that can take advantage of its hierarchical storage management and unique file archiving features. We can recommend Legato Systems, Inc.'s NetWorker only for Unix shops adding network servers.

Administration

You'll likely spend most of your time with these products using administration applications, which makes them critical components.

Cheyenne provides multiple backup server management as part of the base ARCserve product. It can send alerts via E-mail, SNMP, broadcast or pager. We especially liked its calendar view, which lets you see what tapes will be used and what kind of backup will be made each day for a month (see Figure 1).

ARCserve allows you to choose multiple tape verification options, including tape-to-disk compare (which, while slowing throughput, is the most reliable). Like Backup Exec, ARCserve can also perform disk grooming, removing old files from your server after backing them up.

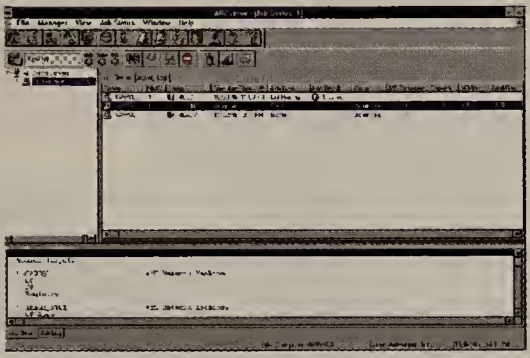


Figure 1: *ARCserve lets you view all of your jobs, even on multiple servers, from a single console.*

NetWorker allows you to view multiple backup servers in turn from a single console but doesn't have a multiple server monitor function like the others have.

There are some differences between the versions of Backup Exec that run on Windows NT and NetWare servers, such as different agents for client workstations. Both allow you to graphically select volumes to back up (see Figure 2, page 86), and both versions include Seagate's ExecView application, which provides global management of multiple backup servers that allows you to see the status and progress of backup jobs on multiple servers. One limitation of Backup Exec compared to ARCserve is that you can't modify a job in progress; you must kill it and start a new one.

Seagate's Visual Storage Administrator (VISTA) enables a single workstation to manage multiple Storage Manager or Backup Director servers, just as ExecView allows a single administrative station to manage multiple Backup Exec backup servers. Unfortunately, VISTA for Windows NT can manage only Windows NT servers and VISTA for NetWare can manage only NetWare servers, meaning you can't manage both from a single console.

Rotation

Many organizations are emotionally wedded to certain tape rotation schemes, so backup software vendors typically offer a variety of approaches.

ARCserve can perform tape rotation using the grandfather-father-son (GFS) or custom methods. With GFS, you make a full backup at the end of each month (the grandfather), a full backup at the end of each week (the father) and an incremental backup each day (the son). By keeping fathers for five weeks and grandfathers indefinitely, you should be able to recover any file protected by ARCserve.

NetWorker supports full and incremental backups and automatic tape rotation using a 10-level backup system. You declare each backup session to be a full backup or a backup at Levels 1 through 9, which are arbitrary designations you can use to meet your backup

ScoreCard

	ARCserve	NetWorker	Backup Exec	Storage Manager
Overall score	**8.9**	**5.7**	**8.4**	**7.9**
Administration (30%)	9	6	8	7
Platform support (20%)	10	4	8	8
Rotation schemes (10%)	7	6	7	10
Device support (10%)	9	4	10	10
Performance (10%)	9	10	9	7
Installation (10%)	9	5	9	7
Documentation (10%)	8	6	9	8

Scores based on a scale of 1–10. Categories are weighted by the percentages shown.

NetResults

Product	**• ARCserve 6 for Windows NT - Enterprise Edition** **• ARCserve 6 for NetWare - Enterprise Edition**	**• NetWorker 4.2.1 for Windows NT** **• NetWorker 4.02 for NetWare**	**• Backup Exec 6.11 for Windows NT - Enterprise Edition** **• Backup Exec 7.11 for NetWare - Enterprise Edition**	**• Seagate Storage Manager - Multi Server Edition**
Vendor	Cheyenne Software, Inc. (516) 465-5057 www.cheyenne.com	Legato Systems, Inc. (415) 812-6000 www.legato.com	Seagate Software, Inc. Storage Management Group (800) 327-2232 www.palindrome.com	Seagate Software, Inc. Storage Management Group (800) 327-2232 www.palindrome.com
Price	$1,395 for either NOS	$1,495 for Windows NT, $2,100 for NetWare (250 users)	$1,295 for Windows NT, $1,395 for NetWare	$3,595
Pros	▲ Easy installation ▲ Multiserver and cross-platform management in main application ▲ Wide range of platform, application server agents ▲ Easy to use	▲ Excellent performance ▲ Wide Unix platform support	▲ Easy installation ▲ Easy to use ▲ Reads ARCserve, Storage Manager tapes	▲ Sophisticated, automated archive and backup management ▲ Provides hierarchical storage management
Cons	▼ Changer support requires add-on ▼ Windows NT server version requires TCP/IP on client	▼ No support for common rotation schemes ▼ Difficult installation ▼ Tech support via callbacks only	▼ Fewer application clients than ARCserve	▼ Multiplatform management requires separate consoles ▼ Requires some time to understand

needs. Each level makes backup copies of those files that have changed since the last backup at a higher level. That is, a Level 2 backup includes all files that have changed since the last backup at Level 3 or higher. While this scheme can be manipulated to create a good balance of backups and archives, it wasn't intuitive to us. We'd prefer that NetWorker also support GFS or Tower of Hanoi, the method employed by Storage Manager.

Seagate's Backup Exec supports automatic tape rotation using the GFS scheme and can also migrate inactive files to tape by following rules that you define.

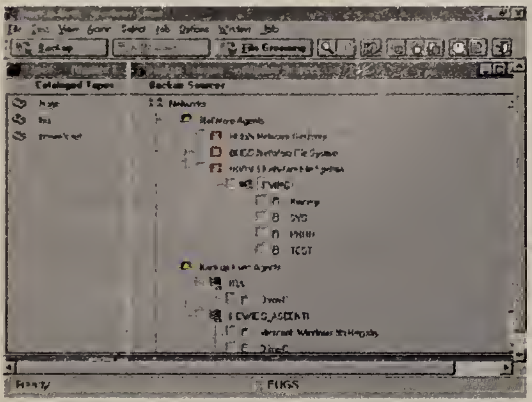


Figure 2: *Backup Exec's graphical client makes it easy to select data to backup or restore.*

By default, Seagate's Storage Manager archives files that have not changed in six weeks. On the day of each tape set rotation (once a week, by default), those stable files are copied to the beginning of the backup tapes. Once a file has been stored on a sufficient number of tapes (three, by default), Storage Manager will not copy them anymore.

During the daily backup process, you can choose to perform a full backup — which despite its name does not include any of these "fully protected" files that are already part of three archive sets — or an incremental backup of the files that have changed since the last full backup.

This approach has two significant advantages over the more common approach, which is to copy all server data on Fridays and do incremental backups each night. The first is that after the initial three archive copies are made, your backup system never backs up the .exe and other files that live on your servers for years without changing, shortening the time and media you need to make a backup.

An even bigger advantage is that Storage Manager keeps not only catalogues of individual tapes, but a database of the files that have been stored on tape. If a user needs an old version of a document, Storage Manager's File Manager makes it easy to see all the versions of the file that exist, select the right one and restore it. Storage Manager will even prompt you to insert the correct tape. Using a more conventional program (such as any of the other three), you'd have a much bigger job.

Storage Manager also includes hierarchical storage management, also known as file migration (see Figure 3). A tape autochanger — or even better, an optical disk jukebox — can host a near-line set of files. In addition to archiving files that haven't changed in six weeks, you can tell the system to migrate files to offline or near-line storage. Whenever Storage Manager sees that a volume on your server is almost full, it can migrate files that haven't been accessed in six months off that volume — leaving zero-byte stub files — until the volume reaches a reasonable level of free space. If a user tries to access the file after it has migrated, Storage Manager automatically restores the file. This works very well if your users have the Windows agent loaded to tell them that the file is being recovered — and if they are patient.

Performance

With more data and smaller backup windows than ever, performance is critical. These products don't differ substantially in the area of performance (see table, page 88). To one degree or another, they all support technologies such as interleaving datastreams from multiple sources to a single tape drive and push agents for servers.

ARCserve's performance was unspectacular, but other features help make up for this. For example, a unique add-on for disaster recovery creates a set of diskettes that allow you to restore a completely failed server without going through the usual routine of reinstalling the operating system and backup program, then starting to restore from tape. The disaster disks boot your system and start restoring directly from the tape drive. Other add-ons let you perform image backups or backup to two mirrored destinations simultaneously.

NetWorker's claim to fame has always been performance. Legato was the first vendor in the PC market to interleave multiple datastreams from separate data sources to a single backup server. In our testing, NetWorker was faster than the competition.

Backup Exec's performance is about the same as ARCserve's and a bit slower than NetWorker's. We were disappointed that Seagate changed Backup Exec's verify function to a cyclical redundancy check of the data on the tape rather than the tape-to-disk comparison used in earlier versions. Seagate explained it made the switch because many users were disabling the old verify function to speed backup and were losing data. We would have preferred they allow the administrator to choose, as Cheyenne did.

In our testing, Storage Manager couldn't match the raw speed of the simpler products. Given the way its archiving scheme reduces the amount of data that needs to be copied in each backup session, however, this isn't a serious drawback.

Agents

Client support generally takes the form of agents that run on different client platforms. All the products we looked at had support for all versions of Windows; some extend support to other client platforms.

One of ARCserve's many strengths is the variety of agents Cheyenne has developed. It now has client agents for both Sun Microsystems, Inc. and Silicon Graphics, Inc. flavors of Unix; database backup agents for Microsoft Corp.'s SQL Server, Oracle Corp.'s Oracle and Sybase, Inc.'s SQL Server 11; and groupware agents for Lotus Development Corp.'s Notes, Microsoft Exchange and Novell, Inc.'s GroupWise. It even has a general-purpose open file backup agent.

Legato doesn't have backup agents for database servers or groupware applications such as those available from Cheyenne or Seagate, but it can back up Unix and NetWare servers.

Seagate has a wide range of backup agents for Backup Exec, including database agents for the Oracle NetWare Loadable Module (NLM), and Microsoft SQL Server and Exchange. Workstation agents include Macintosh and Unix agents. A NetWare push agent, which formats and organizes data into a datastream at the server, rather than having the server making file requests, is also available for NT backup servers. Cheyenne has a similar agent for ARCserve.

Device support

Large organizations need a backup package that supports multiple tape drives and autoloaders.

ARCserve can stream data from multiple data sources to one or several tape drives in parallel on a single backup server. Like NetWorker, ARCserve supports tape autoloaders only if you purchase an add-on autoloader module.

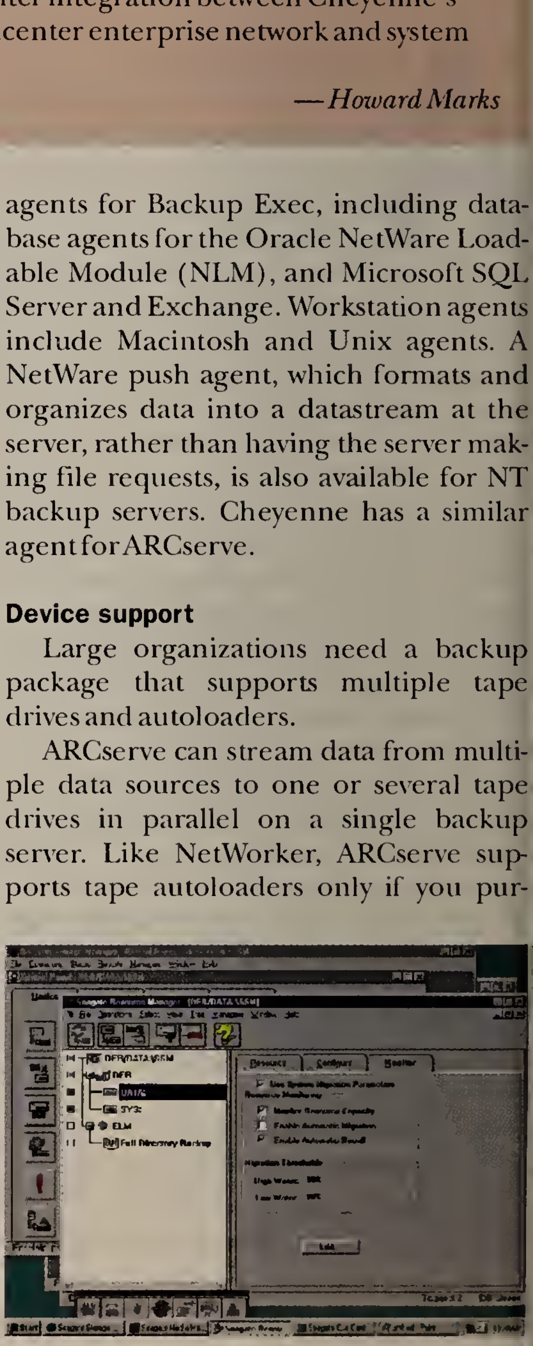


Figure 3: *Seagate Storage Manager's Resource Manager lets you graphically establish file migration rules on selected volumes.*

Backup Exec supports simple tape changers in the base product, but you'll have to spring for an add-on if you have a changer with more than one tape drive. You can have multiple tape drives o changers on a single backup server anc can create backup jobs that are automati cally processed on the next available tap drive. Backup Exec will even automati cally resubmit a job to another tape driv or drive group in the event of a tape driv failure. Unfortunately, it treats an entir changer as a single device, so it will no

What's next?

Seagate Software, Inc.'s recent acquisition of Palindrome Corp. and Arcada Software, Inc., and Computer Associates International, Inc.'s (CA) purchase of Cheyenne Software, Inc. are the latest steps in the ongoing consolidation in the systems management market. What can we expect from these vendors in the future?

Seagate's short-term plan is to merge Palindrome's Backup Director, a basic backup program derived from Storage Manager, into Backup Exec, and make the merged version the company's mainstream backup program. Seagate Storage Exec, the next generation of Storage Manager, will be the high-end product. It will include hierarchical storage management, archiving and other leading-edge features.

The two products will use a common set of agents, and the Seagate ExecView console will control and monitor both.

Over the longer term, these storage management products will be integrated with Seagate's Crystal Reports for reporting and WinInstall for agent installation.

From CA/Cheyenne, we can expect tighter integration between Cheyenne's antivirus and backup products and CA-Unicenter enterprise network and system management tool.

—Howard Marks

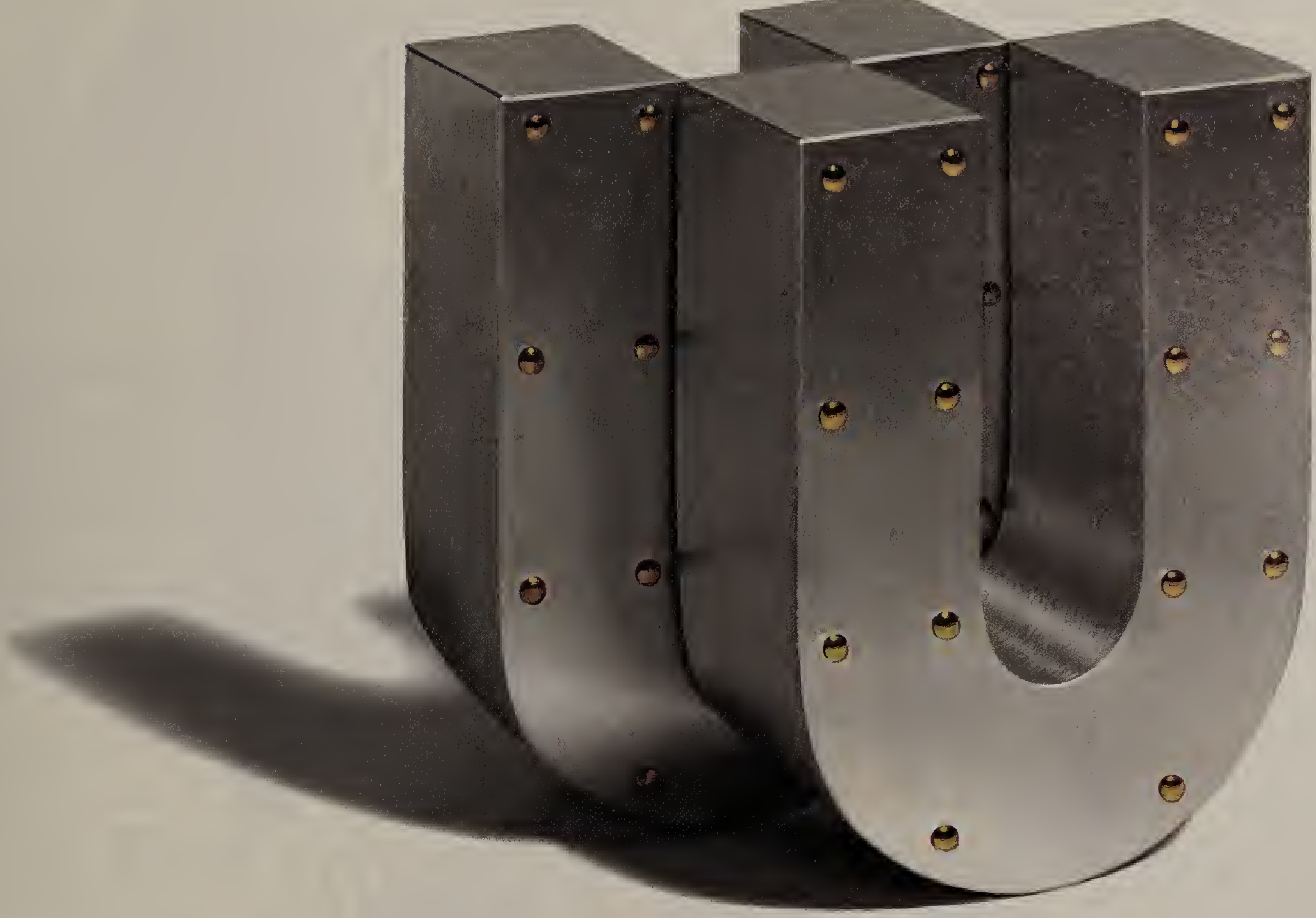
HOW WE DID IT

We tested both the Windows NT and NetWare versions of all four products.

We installed each product on three Hewlett-Packard Co. Netserver LS file servers with 256M bytes of memory running Windows NT Server. The servers connected to a Xylan Corp. OmniSwitch via Intel Pro 100B Fast Ethernet adapters. Our backup hardware included a pair of Advanced Digital Information Corp. VLS DLT autochangers used for performance and autochanger-related testing on Windows NT Server and an Archive Corp. Python DAT drive connected to an Adaptec 2740 SCSI host adapter for all NetWare backup testing.

We backed up a Sun Microsystems, Inc. SPARCstation running Solaris 2.04, a NetWare 3.11 server and Windows NT and Windows 95 workstations to the Windows NT backup servers.

NetWare backup software was tested on a 486/66 EISA bus clone server running NetWare 4.1 and/or 4.11 connected to Windows NT, Windows 95 and a NetWare 3.12 server via NE2000 Ethernet cards.



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Circle Reader Service #**38**

rotate tapes within a changer.

Storage Manager supports tape autochangers — basic and those with multiple drives — and bar code readers as part of the base product.

Installation

Installing backup software should be the easy part, but that was the case with only some of the packages.

The current version of ARCserve is much easier to install than previous versions, especially in NetWare environments where a "preflight check" verifies that the backup server is properly equipped to run ARCserve, including checks on available memory and NLM versions. ARCserve is the only Windows NT product we tested that doesn't use Windows NT tape drivers. This simplifies installation but prevents sharing the tape drive with another application.

Installation is definitely not NetWorker's strong point. The product is distributed on CD-ROM and can be installed on NetWare servers either by mounting the CD on the server or from a Windows 3.1 (but not 95 or NT) workstation.

The first time you restart your NetWare server after installing NetWorker, the server displays a blank blue screen asking you to logon using the ADMIN ID, but the screen doesn't identify itself as NetWorker, which may lead to some confusion. Installing NetWorker's changer option under Windows NT requires that you run a command-line utility, which is pretty uncool in a graphically oriented environment like Windows NT.

BACKUP TIMES FOR 3G BYTES

Product	Time (minutes)
ARCserve	54
Backup Exec	53
NetWorker	42
Storage Manager	65

We were also less than pleased with Legato's technical support. We called each vendor's support line, without identifying ourselves as *Network World* reviewers, and asked to talk to a technician. Legato was the only vendor to stick to a strict callback system, not allowing us to hold or reach a technician, or set an appointment for us to call back.

Installing both Seagate products was uneventful. Like ARCserve, Backup Exec's latest version has a pre-execution NLM and memory check.

End of tape

ARCserve falls somewhere in between the two Seagate products in overall sophistication. When its full range of add-ons are considered, it is a formidable player. Cheyenne also seems to have solved the quality problems that plagued the release of ARCserve for NetWare 5.0.

If you're looking for a traditional backup system, and you have the tape capacity to allow a full backup on each backup session, you'll be well served by Seagate's Backup Exec.

That said, Seagate's Storage Manager is the best of this bunch. That's not to say there aren't caveats to consider: It is the most expensive product in this roundup and is more complicated than the others, meaning you'll have to leave a day or two to familiarize yourself with its features. Nevertheless, those features are what put it above the pack for large organizations. Storage Manager should be on any true enterprise system manager's short list for evaluation. ■

The alliance is a cooperative of users, consultants, educators and integrators that applies its technical and business skills to analyze and compare strategic network products. A list of alliance partners can be found on page 88.

Marks is a principal at Networks Are Our Lives, Inc., a Sherman, Conn.-based consulting firm. He can be reached via E-mail at hmarks@naol.com.

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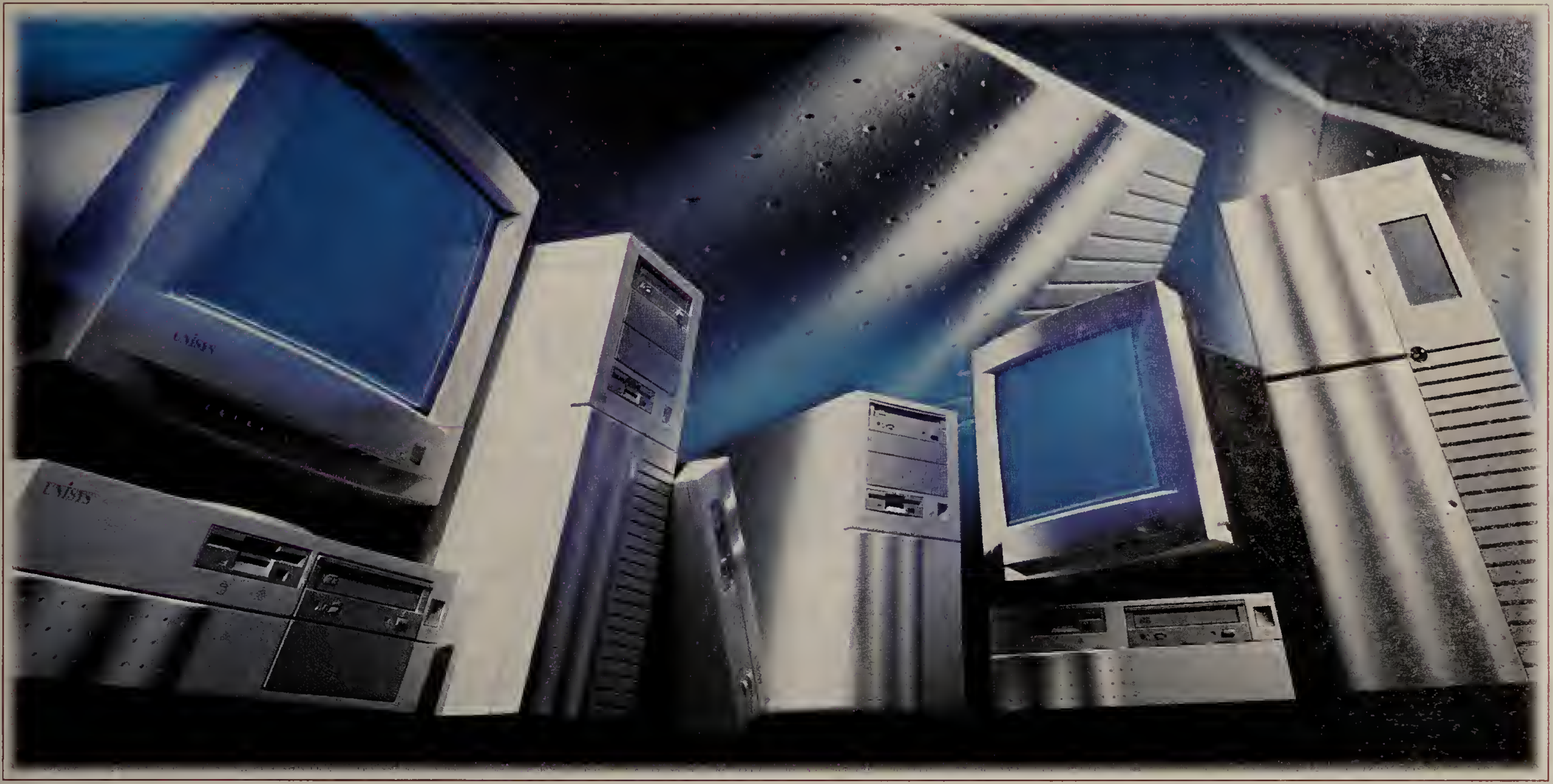

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Briefs

Asset Software International (ASI) *has released* **AssetRadar,** *a Windows-based add-on application to the AssetPro asset management tool.*

AssetRadar measures software usage on all company desktop computers by tracking the amount of time each application is used. This information is forwarded to AssetPro via the AssetPro Data Collection Module (DCM).

Managers can then analyze usage trends to help determine if underutilized software licenses can be reallocated from one user to another instead of purchasing new ones. Users that need more powerful hardware can also be recognized.

Furthermore, license usage patterns can be employed to analyze whether volume purchasing agreements or consumption-based pricing would be more economical software licensing options.

AssetRadar and DCM are bundled together and cost $10 per desktop. AssetPro runs on Windows NT, NetWare 3.X and 4.X, VINES and IBM LANServer networks.

AssetPro costs $30,000 for five concurrent users and can store data in Microsoft Corp. SQL Server, Centura Software Corp. SQLBase, IBM DB2, or Sybase, Inc. and Oracle Corp. database products.

ASI: (613) 723-7374.

The Data Warehousing Institute *will hold its* **Second Annual Implementation Conference** *Jan. 20-25 in San Diego.*

Participants can attend sessions on data modeling, design, quality, architecture, migration, management and mining. Attendees can also hear case studies about large data warehousing projects.

If you register before Dec. 15, the entire conference will cost between $2,095 and $2,195. After Dec. 15, the total cost will be between $2,135 and $2,235. Partial packages are also available.

Data Warehousing Institute: (719) 599-4303.

New law may extend to RSI sufferers

By Loretta Prencipe

A worker who spends approximately six hours a day on the phone and using a computer keyboard developed carpal tunnel syndrome. When the employee reported the injury to management, a question arose over whether the case could be heard under the Americans with Disabilities Act (ADA). According to one federal court, the answer was yes.

More information on the Americans with Disabilities Act

▶The Job Accommodation Network is a free service that provides information and advice on reasonable accommodations in the workplace to employers and people with disabilities. Call (800) 526-7234 for more information.

▶The Department of Justice's ADA information line offers general information, answers to technical questions, free materials and procedural advice about filing a complaint. Call (800) 541-0301.

While some state courts are denying repetitive strain injury (RSI) claims under state worker compensation laws, aggrieved employees are turning to the ADA to have their claims heard.

In a different federal case, a customer service representative for a major car rental company developed wrist tendinitis. She was medically restricted from using a keyboard for more than 30 minutes an hour. Because of her injury and her perceived difficulty working with the company to find a solution, she brought an ADA lawsuit.

Ultimately, neither employee won. However, handling ADA claims for RSI — whether they are successful or not — can be time-consuming, morale-defeating and costly. They also show managers that improper handling of an employee's request for special workstations and other equipment to lessen RSI suffering could lead to a claim under the ADA.

At first glance, the ADA seems straightforward. This federal law prohibits companies with 15 or more employees from discriminating against a qualified individual with a disability.

However, because the ADA is relatively new, the courts are still interpreting much of its content, such as who qualifies to be covered under the act and what constitutes a disability.

When it comes to who qualifies for coverage, the legislation provides some guidelines. The act can apply to any disabled individual who can perform the essential functions of a position with or without what the ADA calls "reasonable accommodations." This person can either be an employee or a job applicant. This means that managers must be aware of the ADA's provisions at all points in the employment process — from hiring to day-to-day management of an employee to termination.

Unfortunately for employers, the ADA does not clearly define what specific disabilities are covered. Instead, the law is flexible, encompassing physical and mental impairments.

As for the impairment, it cannot be a minor or merely bothersome one. It must substantially limit one or more major life activities, such as caring for oneself, performing manual tasks, walking, seeing, hearing, speaking, breathing, learning or working. At least one federal court has assumed that RSI meets these requirements. Other courts have required employees to show just how RSI affects their day-to-day lives, and this is where an RSI claim under the ADA often fails.

Steps for managers

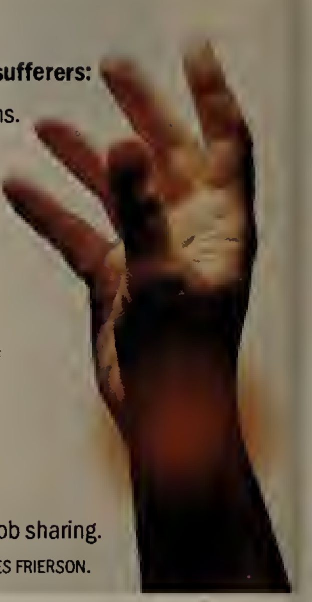
One step managers can take in preparing to deal with an ADA claim is to have a current job description handy. That description should list the essential functions of the position, as well as point out functions that are nonessential. The date the description was written and who wrote it should also be clear. If the job description is outdated, not reviewed regularly or does not accurately reflect what the job entails, it could become the smoking gun in ADA claim litigation.

Preparing to deal with ADA claims also means being ready to show your company made — or offered to make — reasonable accommodations for the person with a disability to perform his job. The law labels it discriminatory for an employer not to reasonably accommodate a disabled individual who can perform the essential functions of the job.

RSI ACCOMMODATIONS

Here are some of the reasonable accommodations employers can make for repetitive strain injury (RSI) sufferers:

1. Provide ergonomic keyboards, chairs and workstations.
2. Train workers in the proper use of equipment.
3. Provide wrist splints or ice packs.
4. Bring in ergonomics engineers or rehabilitation specialists to help design workplaces.
5. Offer unpaid, extended medical leave.
6. Assign RSI sufferers work that requires less use of the affected body area.
7. Provide hourly breaks.
8. Offer instruction on simple strain-relieving hand exercises.
9. Restructure jobs, modify work schedules or institute job sharing.



SOURCE: *EMPLOYER'S GUIDE TO THE AMERICANS WITH DISABILITIES ACT*, JAMES FRIERSON.

Let's be reasonable

This reasonable accommodations arm of the ADA is Congress's way of telling employers to find a solution to the needs of the disabled because the government wants people gainfully employed.

On one level, this could mean making workspaces accessible to people in wheelchairs. At another level, it could mean supplying ergonomically correct pointing devices for computers or wrist rests for keyboards. The key word to keep in mind in all of this is "reasonable" (see graphic).

The ADA does not require an employer to undergo undue hardship in making an accommodation. In fact, it says an accommodation is not reasonable and becomes an undue hardship when it requires significant difficulty or expense. To determine what is reasonable, courts consider factors such as the company's overall fiscal resources, its size and type of operation.

With all the nuances in the law, the jury is still out, so to speak, on whether RSI ailments are covered under the ADA. Many RSI-related ADA claims have gotten to court, but were denied because the employee did not meet all the requirements under the act. But each court opinion gives further guidance on what the ADA requires.

Thus, it is merely a matter of time before an RSI-related ADA claim is successfully brought before the court and an employer is popped for reinstatement, back pay, interest and attorney's fees, as well as compensatory and punitive damages.

Prencipe is an attorney in Springfield, Va., who prefers the gentler art of freelance writing on legal and employment topics. She can be reached at (703) 321-8939 or LWPrencipe@aol.com.

Enter the number below in the DocFinder box on the home page for links to:

- **An article on the type of disability-related questions you can ask – and the medical examinations you can request – once you offer someone a job.**
- **The ErgoWeb site, where you will find information on a variety of ergonomics topics and case histories.**
- **A *Network World* article with tips for preventing repetitive strain injuries.**

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CHIEF OF LEARNING SYSTEMS AND TECHNOLOGY ANNE ARUNDEL COMMUNITY COLLEGE

Anne Arundel Community College, a comprehensive two-year public community college, serving 18,000 credit and 22,000 non-credit students, near historic Annapolis with easy access to Baltimore, Washington and the Chesapeake Bay, invites applications for the position of Chief of Learning Systems and Technology. Reporting directly to the President, this new position supports our strategic priority to use technology to enhance learning, productivity, efficiency, and accountability. The Chief will be responsible for providing creative and innovative leadership in the planning, design, implementation and maintenance of information technology systems, including campus computing, telecommunications and information services in support of the college's learning and administrative functions. The Chief will provide vision and leadership for learning systems such as instructional technology and academic computing, intranet and internet, telecommunications, distance learning, media production and audio visual support services through an Assistant Dean and appropriate directors and managers. Essential qualifications include: a master's degree or an equivalent combination of education and experience in information or learning technology, information systems, systems management or a field of concentration focused on applications of technology for information retrieval, communication networks, or development and support of learning networks; five years of progressively responsible management experience; demonstrated familiarity with operation and management of distance learning technologies, current trends in telecommunications and other technologies in support of instructional delivery systems; demonstrated experience in design, implementation and administration of comprehensive management information systems; and the demonstrated ability to be proactive and innovative in applying technology for creative problem solving. Experience in administration of mainframe systems, PC-based systems and fiber optic-supported systems such as intranet and internet. Experience in our demonstrated familiarity with institutions of higher learning; experience in a community college setting preferred.

Review of applications will begin January 6, 1996 and will continue until the position is filled. Send letter of application and resume to the Office of Human Resources, Anne Arundel Community College, 101 College Parkway, Arnold, MD 21012.

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Identify, evaluate and recommend new network technologies. Troubleshoot network failures and handle escalations as required. Recommend and implement network architectures and analysis tools. Requires 4+ years' experience with the design and implementation of network configurations. Should be familiar with the following: 10BaseT, 100BaseT, CDDI, FDDI, AIM, RS232, V.35 and V.42. Network protocols should include TCP/IP and DECNET.

SOFTWARE ENGINEER

Work with manufacturing and product line customers to define requirements for applications software, as well as deploy applications worldwide to support off-line engineering analysis. Requires solid experience in object-oriented analysis and design. Must have 3+ years' object-oriented programming experience using C++ and SQL programming in a UNIX environment, preferably Sun Solaris or HP-UX.

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Individuals will provide comprehensive network design & consulting. Positions involve supporting the full system engineering life-cycle including: requirements analysis, design, development, integration, test & implementation. Qualified candidates will have strong interpersonal skills. Responsibilities include: product evaluations & engineering trade studies; recommendations to clients for their data, voice & video networks; supervise the installation, configuration & testing of LAN/WAN environments; oversee network components for ISD & project integration laboratories; interface with vendors; lead communications technicians & junior network engineers. (Code: SDNC)

NETWORK ENGINEERS

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The above positions require a BS in CS, EE or related field (MS preferred for Network Consultants) & 5-7+ yrs' progressive technical exp. Qualified candidates will have familiarity w/ networking products from leading network vendors; network architecture, design & implementation credentials. Knowledge of the following technologies is strongly desired: switching, routing, bridging, ATM, remote access, firewalls, VLAN's, Frame Relay, SMDS, TCP/IP protocols, IPX/SPX protocols, Ethernet, Token Ring, SNMP, RMON2, network management tools, network testing & performance analysis tools, fiber/copper cabling standards. Key network vendor certifications a plus. Travel will be required to support strategic customer sites.

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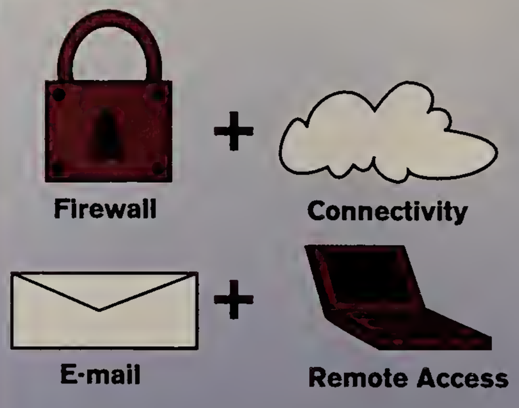

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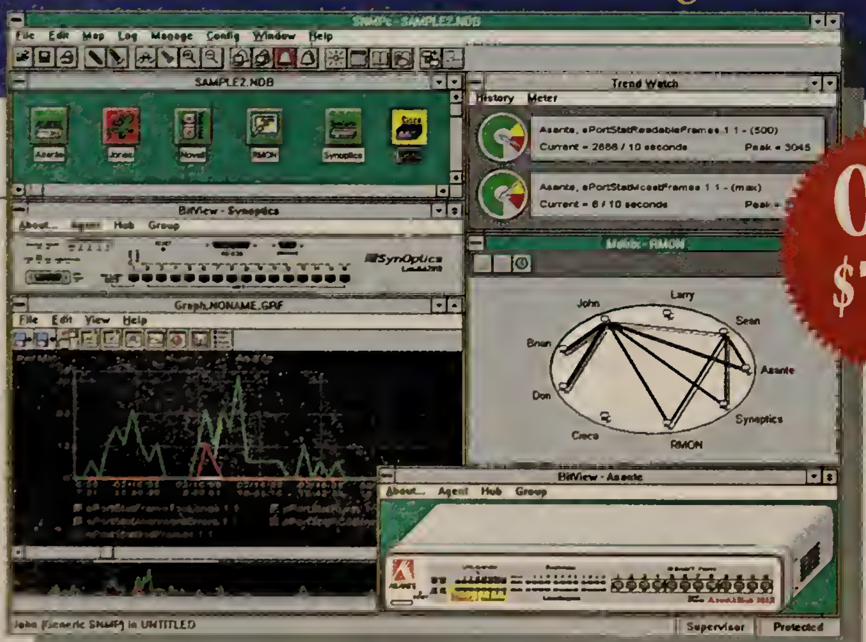

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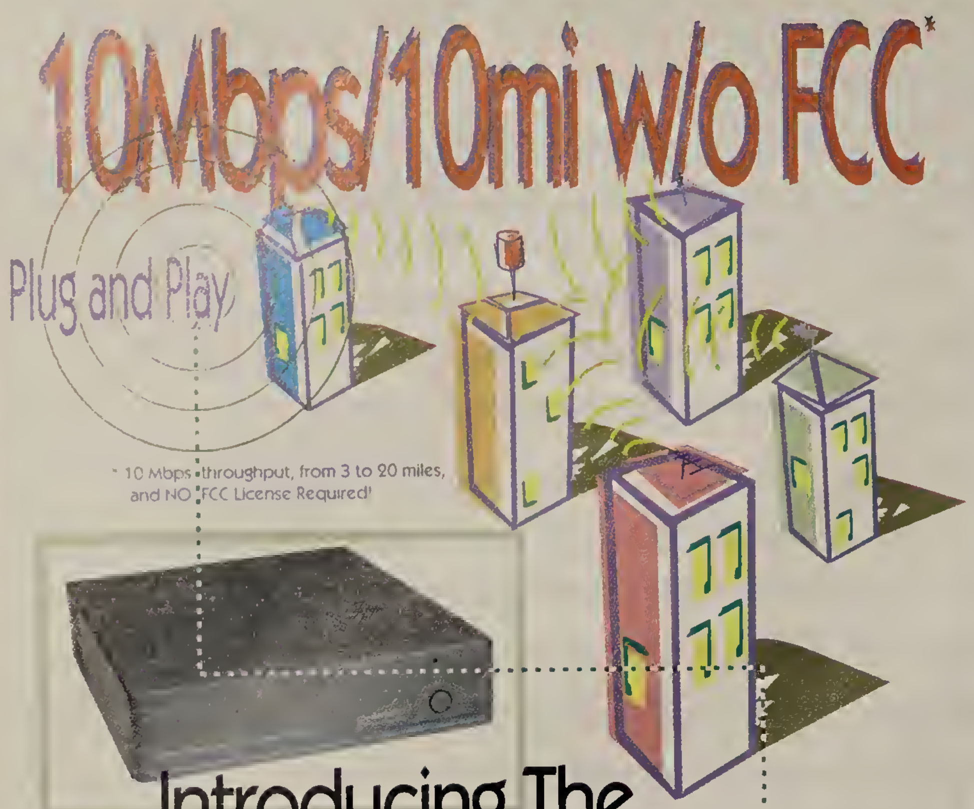
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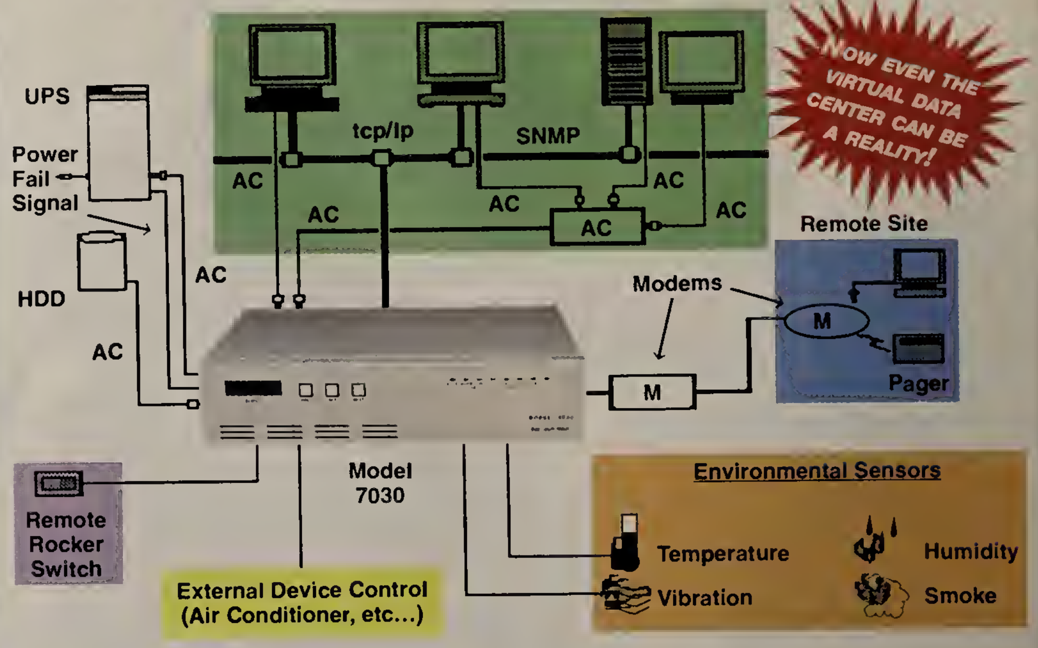

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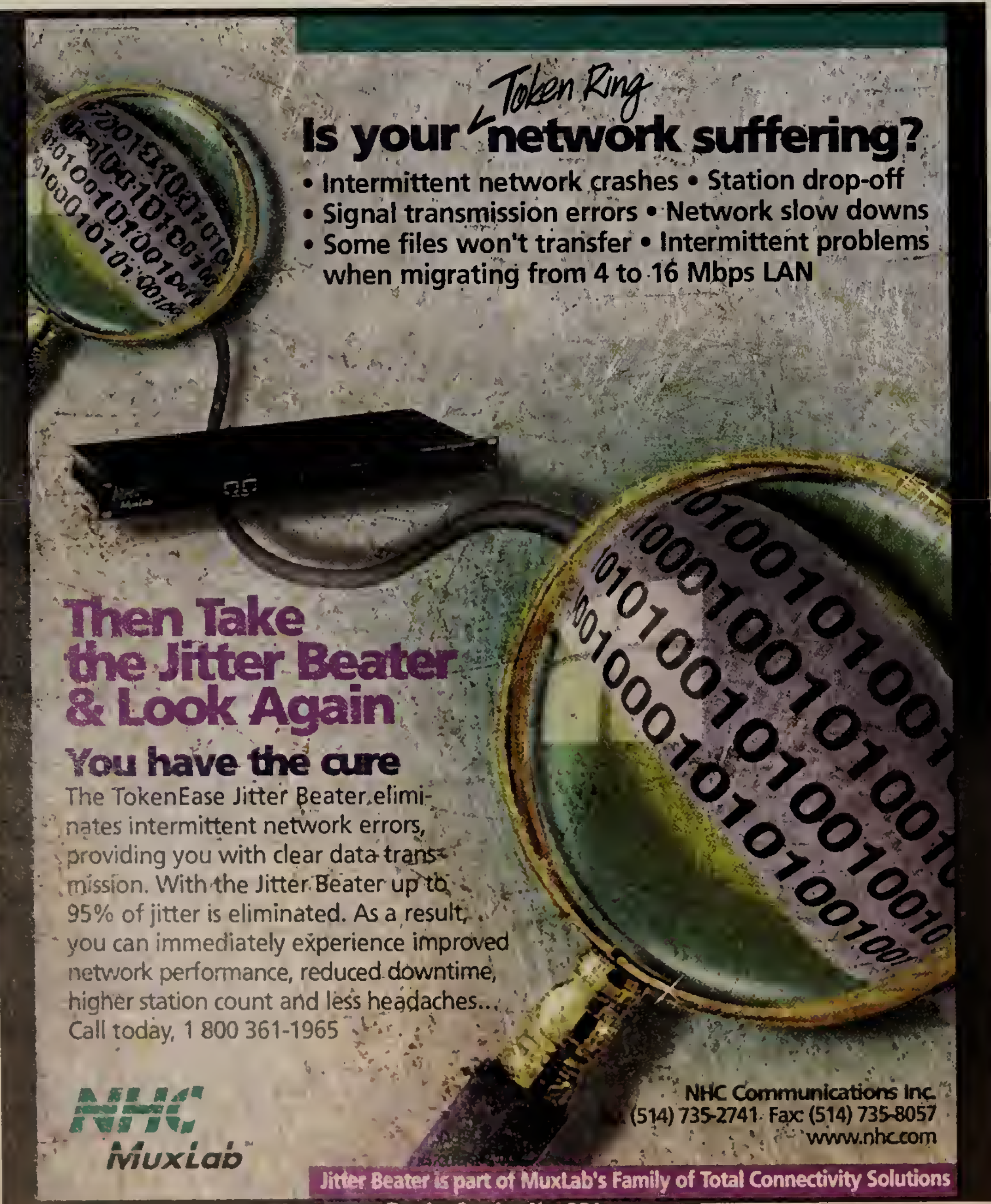

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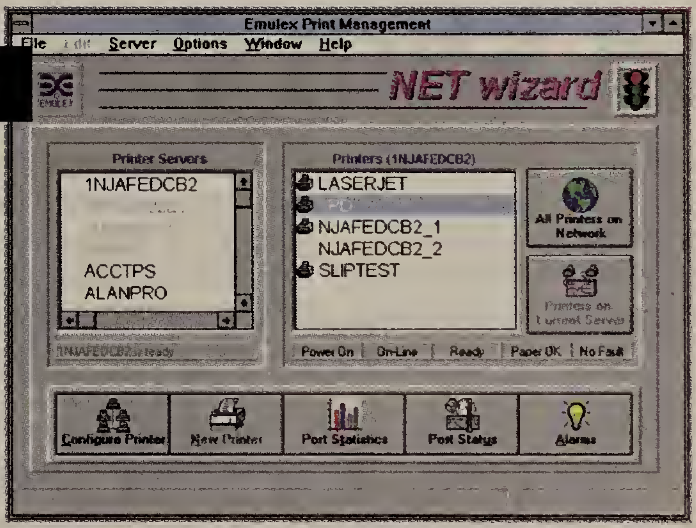

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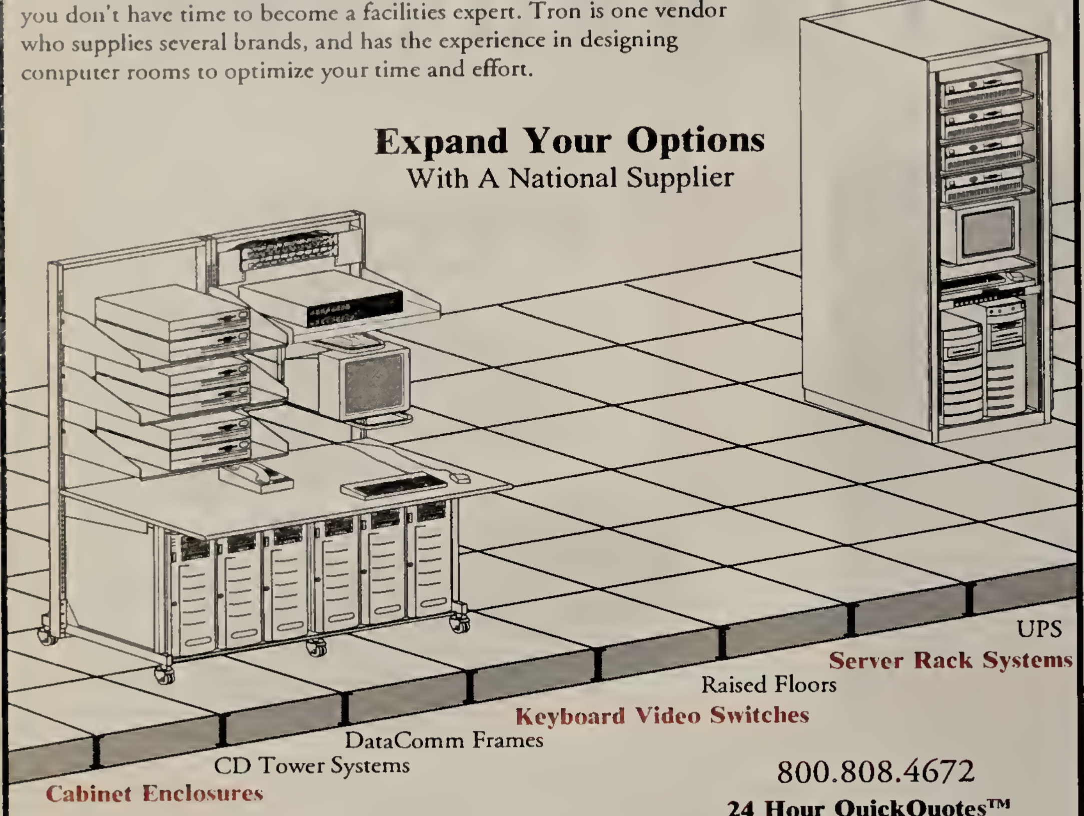

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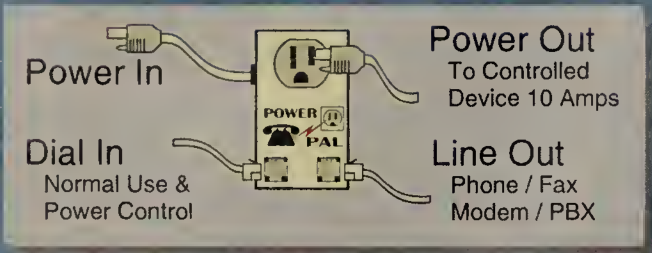

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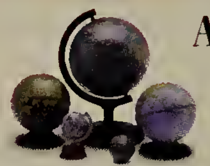

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100 Mbps Fast Ethernet and Ethernet Switches

Special Promotional Bundle

Intel WorkGroup Solution

Express WorkGroup Switching Hub Bundle gives servers dedicated 100Mbps bandwidth, moving clients to 100Mbps with Intel Hubs and Adapters, and a downlink module to connect to existing 10Mbps LANs. The WorkGroup Solution includes:

One Intel Switching Hub (ES100TX)
Three Intel Twelve-Port Stackable Hub (EC100TX)
Thirty Intel 10/100 32-Bit PCI Adapters (PILAB465B)
Two-Port 10/100 Downlink Module (EC100DL)

Cost for Bundle ....$10,195 (Expires 11/30/96)

10/100 Ethernet Switches

INTEL

Express Switching Hub, Five Switched 100Base-TX Ports, Plus Two Slots for 100Mbps TX/FX (ES100TX)	**$3,100**

Two-Port 10/100 Downlink Module for 10Mbps LAN Connectivity (EC100DL)	**$725**

NBase

MegaSwitch II 10/100 Auto-Sensing Eight-Port Switch Plus Two Slots for 100Base TX/FX/ATM/GigaBit Modules (NH2012)	**$6,495**

BAY NETWORKS

Bay Network Lattis Switch System Fast Ethernet Switching Hubs

10/100 Mbps UTP Switch,16 RJ45 Supports 10/100 Mbps Ethernet, Mode (28115)	**$6,435**

100Mbps *Fiber Optic* Switching Hub (28104)	**$13,080**

NBASE

MegaSwitch 100 FO Five 100Base-FX Ports (NH2007FO)	**$5,100**

Special WorkGroup Switch Bundle

This Bundle gives you Four (4) 100Mbps switched ports for servers and bandwidth hungry clients, plus Six (6) 10Mbps switched ports for Ethernet segment and an option of adding Two more TX or FX Port Modules. NBase WorkGroup Bundle Includes: One MegaSwitch 100 with Five 100Base-TX Ports (NH2007) and a Six-Port 10Base-T MegaSwitch RJ45/AUI with One 100Base-TX Port (NH208+1MP) Includes SNMP Managenment and Flow Control **$6,200**

CISCO SYSTEMS

PROStack EtherSwitch Stackable Ethernet Switch, Sixteen RJ45,Two Expansion Slots for High-Speed Modules, 100Base-TX/ATM (CPW1601A)	**$3,790**
(CPW1601B)	**$4,425**
100Base-T module for PRO16,1 RJ45 (CPW100T)	**$972**
EtherSwitch 1200, Twenty-Five 10Base-T Ports, Two 100Base-TX,1K MAC (CPW1200)	**$3,695**
EtherSwitch 1400, Twenty-Five 10Base-T, Two Slots 8K MAC (CPW1402)	**$5,665**
One-Port 100Base-TX Module (CPW1411-X)	**$686**
Eight-Port 100BaseTX Module (CPW1418-X)	**$1,695**
Twelve-Port 10/100 Auto-Sensing Ports Plus Two Fixed 100TX Ports (CPW2201)	**$12,450**

D-Link

Five-Port 10/100 FlexSwitch With Five 10/100 PCI Adapters (DES 3205)	**$2,100**
ProFast Switch Four 10Mbps Ports Plus One 100Base-TX Port(DES 2205)	**$890**

3COM

LinkSwitch 1000, Twenty-Four Switched 10Mbps Port, One 100 Base-TX Fast Port (3C16900)	**$3,135**
LinkSwitch 1000, Twelve Switched 10Mbps Ports, One 100Base-TX Fast Port(3C16901)	**$2,505**

LinkSwitch 3000, Five Switched Fiber SC 100Base-FX Ports, One Switched copper 100Base-TX Port (3C16940)	**$7,525**
LinkSwitch 3000, Eight Switched 100Base-TX Ports (3C16941)	**$5,575**

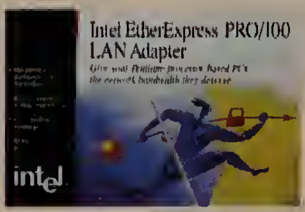
ASANTE

Fast 10/100 Bridge, Integrate 100Mbps Fast Ethernet to Existing 10Mbps Ethernet	**$799**
Ready Switch Four 10Base-T Ports, One 100Base-TX Port with SNMP	**$2,049**

100 Mbps Fast Ethernet Adapters

INTEL

Ether Express 10/100 PCI (PILA8465B) Single/5PK/20PK	**$110/530/1,850**
Ether Express PRO/100 32-bit EISA (EILAB265)	**$235**
Ether Express 10/100 ISA Adapter (PCLA8560)Single/5PK/20PK	**$159/825/2,895**



Intel Smart 100 Nitro High Performance Server Adapter(PILA8485)	**$715**

3COM

10/100 PCI (3C905TX) Single/5PK	**$135/630/2395**
10/100 EISA (3C597-TX)Single/5PK	**$251/1,228**

COGENT

PCI Quartet,Full Duplex,4RJ45 Ports (EM400)	**$1,137**
10/100 PCI (EM110TX)	**$190**
10/100 PCI (EM440)	**$1,170**
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D-Link

Pro-Fast 10/100 PCI Adapter (DFE500TX)	**$99**

SMC

10/100 EISA (SMC9232DST)	**$240**
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ASANTE

10/100 PCI Adapter for PC and MAC	**$187**

COGENT

PCI-SC Connector (EM100)	**$499**
PCI-ST Connector (EM100FX)	**$499**
Eight-Port Fast FX Hub (S-800)	**$3,285**

FDDI Adapters

NETWORK PERIPHERAL

SAS PCI Singlemode (NP-PCI-S50)	**$599**
SAS PCI Multimode (NP-PCI-S10)	**$995**
DAS PCI Multimode (NP-PCI-D10)	**$1,360**

100 Base-TX Fast Ethernet Hubs

INTEL

Express Stackable Hub, Twelve 100Base-TX Ports Stackable up to Six Units (EC100TX)	**$1,450**

Hub Bundle with Ten Adapters (PILA8465B)	**$2,467**

NBASE

100Base-TX Eight-Port Hub (NH108)	**$1,100**
Hub Bundle NBase (NH108) and Five Intel Adapters (PILA8465B)	**$1,295**

100Base-TX Twelve-Port Stackable Hub (NH1012)	**$1,425**

D-LINK

100 Base-TX Twelve-Port Hub (DFE-812TX)	**$1,342**
Eight-Port 100Base-TX Hub (DFEB0BTX)	**$565**

ASANTE

100 Base-TX Twelve-Port Stackable Hub	**$1,545**

BAY NETWORKS

Twelve-Port 100Mbps Hub (AT2202-001)	**$1,260**
Hub Bundle with 100Mbps Hub (AT2202-001) with Ten Intel Adapters (PILA8465B)	**$2,265**

3COM

100 Base-TX 12-Port Stackable Hub (3C250-TX/1)	**$1,725**

100Base-T4

Fast Ethernet with CAT 3 UTP Support

COGENT

10/100 PCI (EM110T4)	**$190**
12-Port Stackable T4 Hub (S-1200)	**$1,590**

100Mbps Macintosh

FARALLON

Fast Ether TX-10/100 NuBus (PN990)	**$328**
Fast Ether TX-10/100 PCI (PN994)	**$240**

ASANTE

Fast 10/100 NuBus(99-00-364-00)	**$299**

ATM

Efficient Networks

155.52Mbps PCI ATM Adapter with 512K Memory (ENI-155P-MF-C)	**$1,200**

NBASE

Multimode to Singlemode ATM Converter, 20KM Single Link (Node Attach) (N420ATMI)	**$3,995**

Fibre Channel - The ATM Alternative

ANCOR COMMUNICATIONS

Gigabit Fibre Channel, 1.0625 Gigabaud per Channel, Sixteen-Port FCS1062 Fibre Switch	**$46,797**
FCS1062 PCI Adapter	**$3,273**

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Internet & Remote LAN Access Products

ADTRAN

T1 DSU/CSU, V.35 Dte N1-24, T1 and Fractional, B8ZS/AMI, SF/ESF Framing	**$1,390**
TSU-T1,1200-.060 L1 Data Channel DSU/CSU	**$995**

ASCEND

PipeLine 25-FX Four Users, POTS, ISDN Bridge, IP/IPX Routing, Compression, Built-in NT1 (1UBRI-RTR-C)	**$1,095**
PipeLine 75 Unlit-Users, POTS, ISDN Bridge, IP/IPX Routing, Compression, Built-in NT1 (1UBRI-ASD-D)	**$1,195**

BAY NETWORKS

BayStack Access Node (AN) Router, Ethernet, Two Synchronous Ports, IP Access Suite, Quick2Config Ver.1.1, Router Contig. Utility	**$1,995**
BayStack Access Node Hub (ANH) Eight-Port Ethernet Hub, Two Synchronous Ports, IP Access Suite, Quick2Config.Ver.1.1, Router Config.s Utility	**$2,235**

3COM

NetBuilder Remote Office 422, ISDN Access Super Stack Router, IP and IPX (3C8422)	**$2,699**

ACC SYSTEMS

Nile Branch Office Bridge/Router with IP/IPX, AppleTalk, One RJ45 LAN Port, One ISDN BRI, One V.35 Port	**$2,445**

BAT

SU 56K DDS, Point to Point or Multipoint, DSU/CSU,V.35 InterFace, Front Panel LEDs	**$425**

CISCO SYSTEMS

2501-IP Router, One Ether Port, Two Serial Ports, Dial on Demand	**Call For Prices**
2503-ISDN IP Router, One Ether Port, Two Serial Ports, ISDN BRI Demand	**Call For Prices**
2514-1IP One Serial Router, Dual Ethernet Ports, Dual Synchronious Serial Ports, Auxilory Analog Serial Ports	**Call For Prices**

Ethernet Network Adapters

WEST HILLS

ISA BNC (ENET16C)	**$32**
ISA RJ45 (ENET16T)	**$30**

ISA RJ45/BNC (ENET16CT)	**$32**
RJ45/BNC/AUI (HT2100PCI+PCI)	**$60**
RJ45/BNC/AUI (HT2100VL VLB)	**$60**

For SMC,3Com, and Intel Ethernet Adapters -Please Call For Prices

Hubs

WEST HILLS

Eight-Port 10BT Hub, BNC & AUI Ports (HT08TP)	**$89**
Sixteen-Port 10BT Hub, BNC & AUI Ports (HT16TP)	**$178**
Thirty Two-Port 10Base-T Hub BNC/AUI (HT832TP)	**$356**

Sixteen-Port 10BT Smart Hub, AUI Ports (UE2041)	**$290**

Transceivers

AUI to TP	**$30**
AUI to BNC	**$30**
AUI to 10Base-FL	**$249**
AUI to MultiMode Fiber (1300nm,5Km)	**$449**
AUI to SingleMode Fiber (1300nm,10Km)	**$549**

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Switched and Fast Ethernet, How It Works and How to Use It, The Only Book Dedicated to The Latest In Ethernet Networking Technology **$39**

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Netware ver. 3.12/IntranetWare 4.11-50 user	$1,995*
Netware ver. 3.12/IntranetWare 4.11-100 user	$2,795*
Netware ver. 3.12/IntranetWare 4.11-250 user	$4,995*
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*Upgrade prices vary - Qualification required

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MICROSOFT - Windows NT v. 4.0

Windows NT ver. 4.0 for Server	$ 689
Windows NT ver. 4.0 Server plus 10 Client	$ 995

ISDN REMOTE ACCESS WITH MICROSOFT

EICON ISA DIVA for Windows NT w/NT1	$ 1460
EICON DIVA for Windows 95 w/NT1	$ 545
EICON DIVA for Win.95 (PCMCIA) w/NT1	$ 545
EICON for Windows NT (ISA) w/NT1	$ 445
EICON DIVA for Win.NT (PCMCIA) w/NT1	$ 545
EICON ISDN Server for Win. NT (SCOM)	$ 875
EICON ISDN Server for NT w/ Quadro	$2,700
EICON ISDN Server for NT w/ S2M-PRI	$3,550

ISDN REMOTE ACCESS WITH NOVELL

(ISDN Connectivity to ISP or INTERNET Server)

EICON Connections for Netware & Quadro	$2,880
EICON Connections for Netware & S2M/PRI	$3,725

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(Frame Relay / PPP / X.25 / ISDN)

EICON WAN Services for NT & S51 card	$1,480
EICON 305-826 MPR PacketBlaster/ NOVELL	$1,355

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EICON 305-674 PacketBlaster for NOVELL	$ 675
EICON S51 Card & WAN Services for NT	$1,480

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Complete Plug-n-Play hardware and software solution that connects an entire LAN to the INTERNET in just minutes! Enabling all LAN users to simultaneously access the Internet, a hardware firewall and more. . .

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BAY Networks 1023 - 1 Ethernet & 1-ISDN port	$2,495
BAY Networks 1021 - 2 port RJ-45 & 1 Async port	$2,395
BAY Networks 1024 - 2 Ethernet & 1-ISDN port	$2,795
BAY Networks 1029 - Dual Ethernet for T1 Router	$2,195
BAY Networks 1031 - Dual Token Ring for T1	$3,150

100 Mbps FAST ETHERNET ADAPTERS

3COM - 3C595TX 100Mbps PCI	$ 145
ASANTE 10/100 adapter for MAC	$ 185
D-LINK DE - 530CT 32 bit PCI 100BTX	$ 95
D-LINK DFE - 5OOTX PCI 10/100	$ 95
INTEL PILA 8465B 10/100 PCI	$ 125
INTEL PILA8485 Smart 100 for SERVER	$ 695
SMC 933DST 10/100 - PCI	$ 185
SMC 923DST 10/100 - EISA	$ 235

100 Mbps FAST ETHERNET HUBS

3COM 12-port Stackable Hub	$1,825
3COM LinkSwitch 1000 (3C16901) 12 & 1	$2,595
ASANTE 4&1 10/100 with SNMP	$1,995
BAY NETWORKS 12-port 100BTX Hub	$1,845
D-LINK DFE - 808TX / 8-port / Stackable	$ 750
D-LINK DES - 2205 5-port 4&1 Switch Hub	$1,100
IBM 8223 / 8-port Fast Ethernet Workgroup	$1,275
IBM 8271-108 Ethernet LAN Switch	$3,200
INTEL (EC100TX) 12-port Stackable Hub	$1,845

REMOTE ACCESS / ROUTERS

3COM (3C8422) IP / IPX Router	$2,675
ASCEND P25-1U-PX ISDN/IP Router	$ 610
ASCEND P25-1U RTR-CO-FX Router	$ 945
CISCO (0753) Remote Office ENET/ISDN	$1,295
CISCO (1004-A) ENET/ISDN IP Router	$1,500
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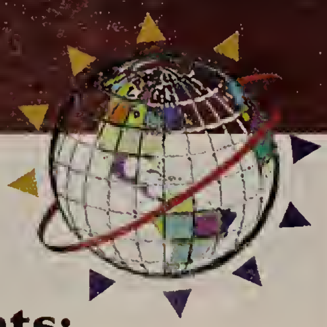

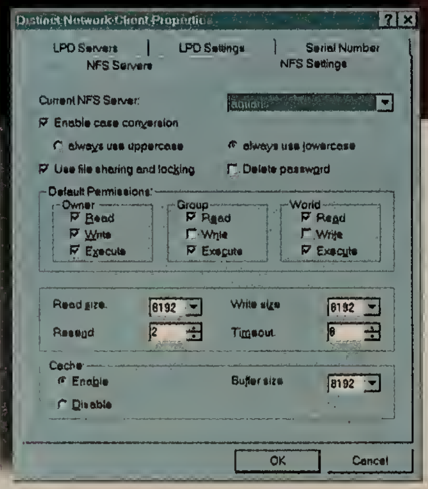

Current NFS Server:

☑ Enable case conversion

○ always use uppercase ● always use lowercase

☑ Use file sharing and locking ☐ Delete password

Default Permissions:

Owner: ☑ Read ☑ Write ☑ Execute

Group: ☑ Read ☐ Write ☑ Execute

World: ☑ Read ☐ Write ☑ Execute

Read size 8192 Write size 8192

Resend 2 Timeout 6

Cache: ● Enable ○ Disable Buffer size 8192

Highlights:

- Integrates seamlessly into Windows 95
- Mounts NFS drives from Explorer or Network Neighborhood
- Supports file and record locking
- Allows central authentication with a single server running PCNFSD for all NFS connectivity
- Prints to NFS or LPD print servers
- Allows login to all systems with a single login name and password or different login names for each system
- Allows single-operation logout of all systems accessed through Network Neighborhood
- Fine tunes performance parameters for each server you access

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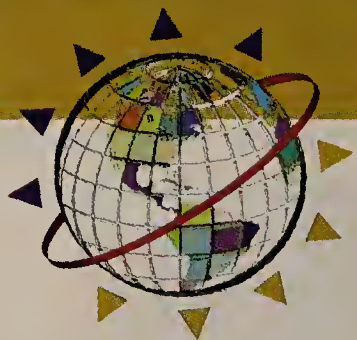

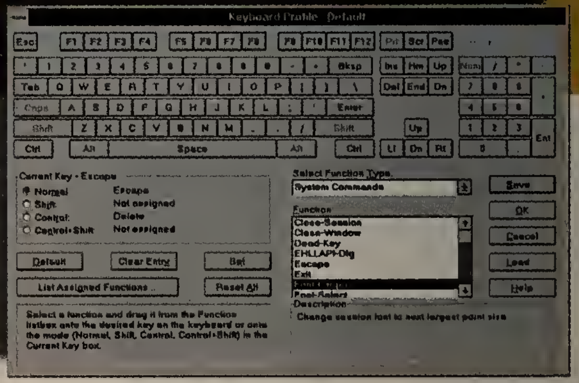

Current Key - Escape

● Normal Escape

○ Shift Not assigned

○ Control Delete

○ Control+Shift Not assigned

Select Function Type: System Commands

Function: Close-Session, Close-Window, Dead-Key, EHLLAPI-Dlg, Escape, Exit, Font-Select

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Select a function and drag it from the Function listbox onto the desired key on the keyboard or onto the mode (Normal, Shift, Control, Control+Shift) in the Current Key box.

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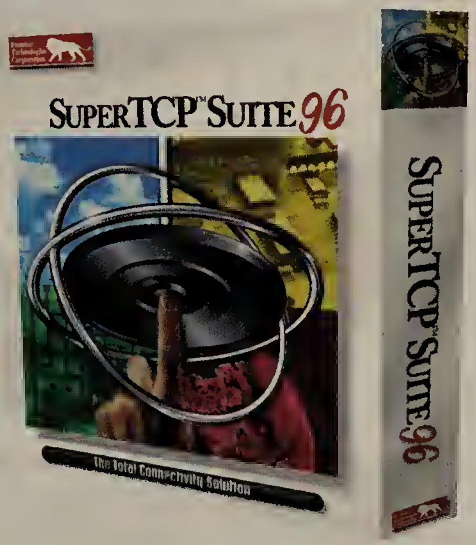

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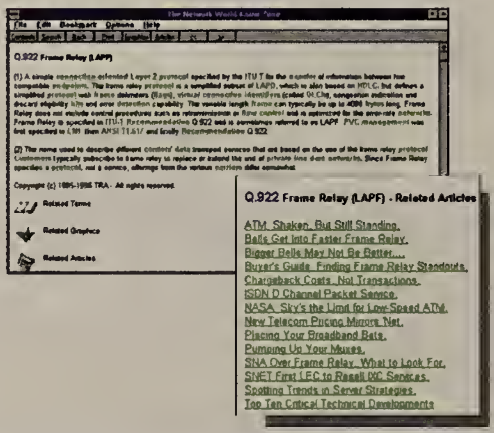

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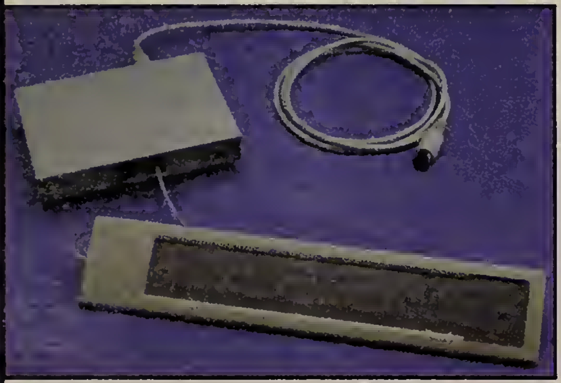

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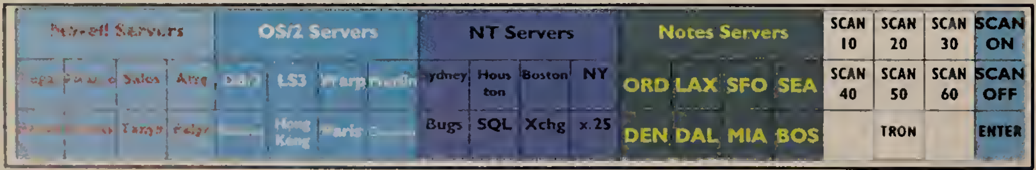

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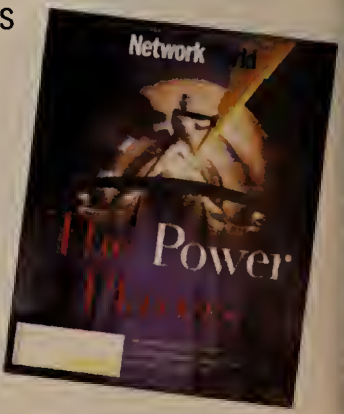

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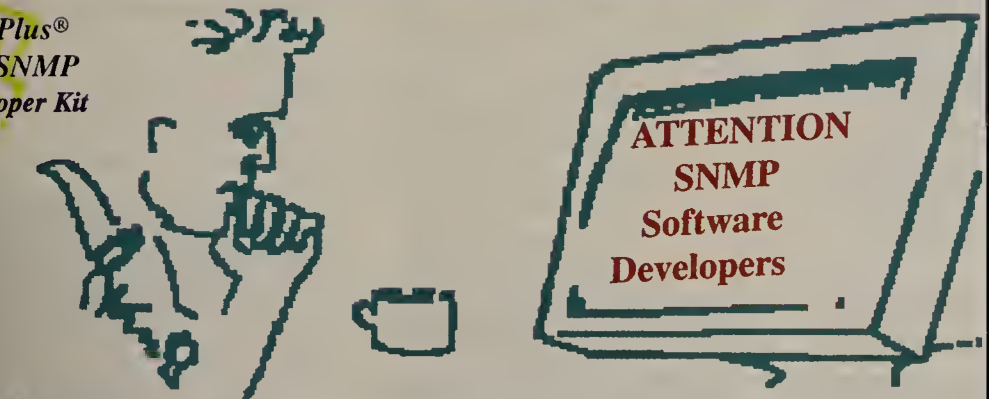

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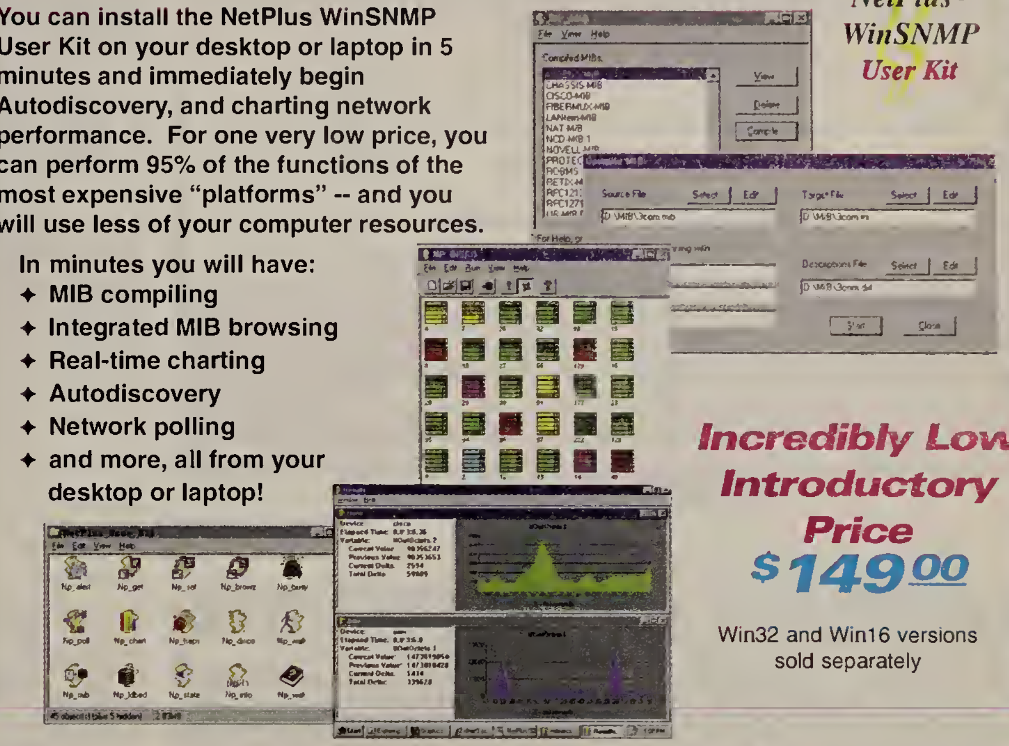

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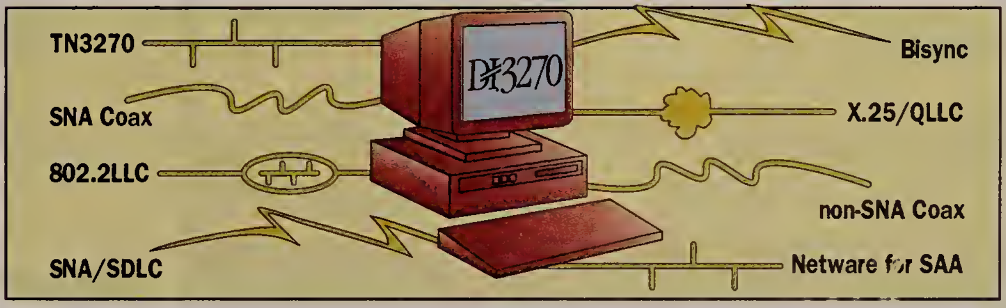

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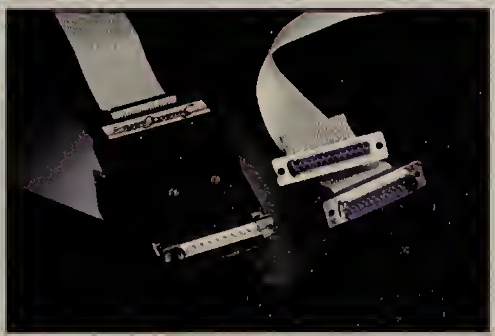

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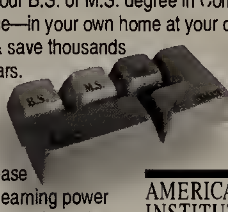

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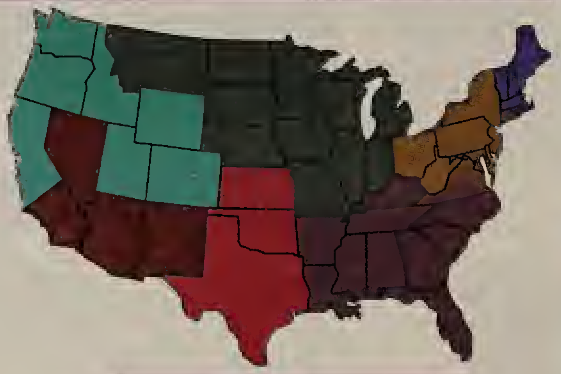

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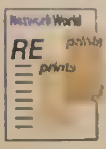

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TMT

Continued from page 1

fees (*NW*, Sept. 16, page 1).

The savings the new arrangement will bring to the medical center should allow the health care provider to extend its network applications to include data links to affiliated physicians' offices for teleradiology, access to lab results, and hospital scheduling and registration.

TMT does not want to be everyone's phone company; it was set up to save the hospital money. But since it won approval in August to provide phone service across Florida, it now plans to share its windfall with other hospitals and medical groups, selling them services at less than what they would otherwise pay.

So when the time comes to file a tariff with the state's public service commission, TMT will limit its service area. Only hospital property and that of affiliates will be included, according to Jerry Davis, a senior consultant with San Francisco-based COMSUL, Ltd., which helped set up TMT.

VITAL SIGNS FOR TALLAHASSEE MEMORIAL

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Payback time from forming own phone company:	1-2 years

The cost of setting up the legal and regulatory framework for a paper phone company is about $100,000 at best, Davis said. That number can swell considerably if the incumbent LEC drags its feet and the case has to go to arbitration, he added.

Under the telecommunications legislation, competitive carriers must be granted significant discounts if they want to resell services. And the monopolistic LECs may only sell competitors the individual pieces of their nets that the competitors want, such as local loops and switching.

TMT is relying solely on the wholesale rates for its savings, but the law offers even more opportunities, according to Howard Anderson, president of The Yankee Group consultancy in Boston. In addition, he said, organizations with their own telephone switches can save more. Switch-based carriers do not have to pay the local access charges that are part of any long-distance bill.

Other consultants said clients that have started the process to become phone companies are generally large, multisite corporations such as health care facilities, banks and universities.

But Bill Morgan, a principal in W&J Partnership in Morgan Hill, Calif., said smaller companies could cooperate to form a single LEC, and not simply for cost savings.

"It's possible for user organizations to build whatever they want and make it work if they believe they can't purchase the quality they want from the current carriers," he said.

Morgan said the process takes about 18 months of planning and procurement. A rule of thumb is that a company with more than 5,000 phone lines might want to consider becoming a LEC or banding together with others to do so.

The savings depend on local pricing and service contracts under which the company is already buying service.

The 700-bed Tallahassee Medical Center has 2,200 access lines and a monthly local phone bill of approximately $20,000.

With hopes of saving $6,000 per month, TMT had a sufficiently short payback period, according to Dennis Gallitano, a Chicago attorney who represents the hospital in the TMT venture.

Gallitano said the Federal Communications Commission discourages this type of LEC if it serves only the parent company. But the FCC is less harsh about affiliated businesses like the Florida health care group. ■

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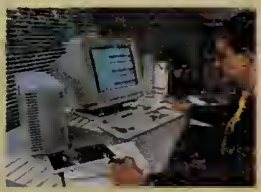

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Circle Reader Service **#46**

Ipsilon

Continued from page 1

installed base.

"It's a chink in the armor of Cisco," said Frank Dzubeck, president of Communications Network Architects, Inc. in Washington, D.C. "I don't think Ipsilon's going to make any impact, [but the company's] alliance partners might."

Ipsilon's IETF proposal for what it calls a next-generation IGRP — or IGRPng — defines how IGRP can avoid routing loops, support multiple address families and work with IPv6.

To date, Cisco has been the sole supplier of IGRP and has never licensed the code outright. Users get it by purchasing Cisco routers; vendors gain access to it by reselling Cisco routers.

Ipsilon developed its IGRP from publicly accessible specifications on the Cisco Web site and at Rutgers University in New Brunswick, N.J.

By offering an alternative source to Cisco for IGRP, Ipsilon appears to be raising the ante in Cisco's recent campaign to become more open with its technology. Cisco kicked off a multivendor crusade two weeks ago to push its Tag Switching scheme — an alternative to Ipsilon's IP Switching — through the IETF (*NW*, Nov. 4, page 1).

"Here's our response [to the Tag Switching campaign]," said Larry Blair, Ipsilon director of marketing. "If you're committed to openness, we are too."

"By having a monopoly hold [on routing] and obscene margins, Cisco's ripe for competition," added Tom Lyon, Ipsilon chairman and chief technology officer.

PROFILE: IPSILON NETWORKS, INC.

Headquarters:	Palo Alto, Calif.
Founded:	1994
Primary product:	IP Switch ATM 1600
Financials:	Privately held; has received more than $22 million in venture capital
Employees:	85

That's welcome news to some Cisco shops looking for price/performance relief. Ipsilon claims it can offer high-performance IP internetworking at 20% of the cost of a high-end router.

"Cisco, and router vendors in general, have not made any attempts to lower the price per port on their routers," said Phil Emer, assistant director for network technology development at North Carolina State University in Raleigh. "Something like IP switching is going to convince your big router vendor that it's time to decrease the price per port because it's artificially high."

Cisco views Ipsilon's move as an endorsement of its technology. However, the company will also investigate Ipsilon's product further to determine whether Ipsilon violated any intellectual property safeguards, according to Art Feather, Cisco's director of IOS software marketing.

"They must feel like they're on safe ground," he said.

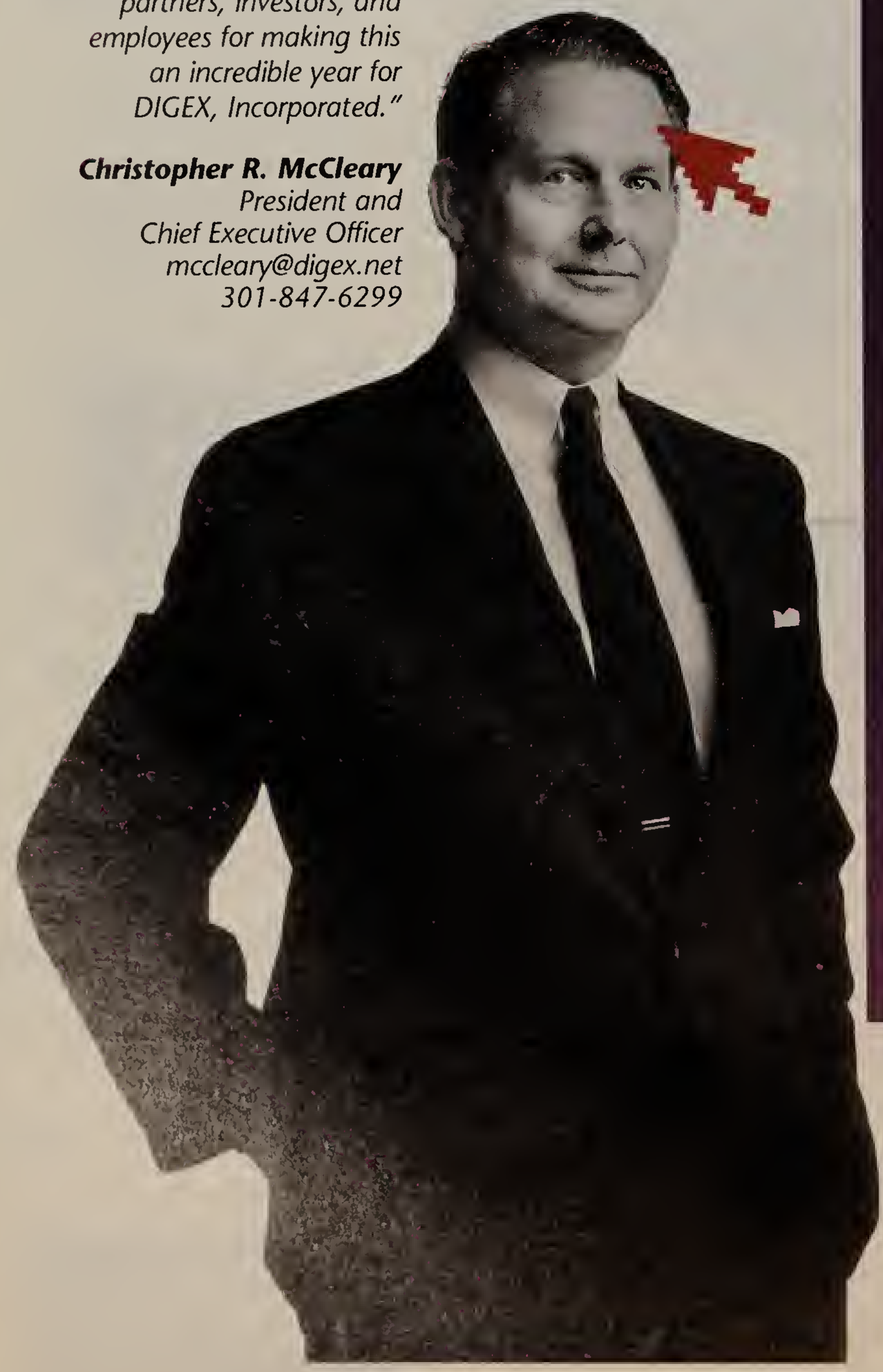
Analysts say Cisco may feel some sting from Ipsilon's IGRP and IGRPng maneuvers.

"It allows Ipsilon to go directly into Cisco accounts now. They don't have to do any tiptoeing about," said John McConnell, president of McConnell Consulting, Inc. in Boulder, Colo.

IGRPng maintains IGRP's distance vector algorithms but omits the protocol's variance property, which Ipsilon claims caused routing loops, and IPv4 type of service support. It adds an address family identifer, which allows IGRPng to carry routing information for a variety of network protocols, and a more efficient topology update packet. ■

COMMENTS?

See "How to reach us" on page 5.



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*Circle Reader Service #***64**

USAA

Continued from page 14

as quickly in the desktop arena as switched Ethernet was," she said. "Token ring, in our review of where the market was going, was falling off."

End users will be grouped into 170 virtual LANs for flexibility in moving from segment to segment, based on cross-departmental work requirements. Initially, VLANs will be configured via static port assignment. Later, USAA plans to configure VLANs dynamically based on media access control addresses and lines of business.

"The goals are to give us more of a plug-and-play capability so there isn't as much work when we move around," Grant said. "We have a flexible structure here so we move around within our complex quite a bit. That can have a great deal of payback for us if we can simplify the impact of moves, adds and changes."

USAA will be installing 1,185 Cisco Catalyst 5000 switches on floors and in wiring closets to provide 10M and 100M bit/sec switched connectivity to desktops and servers, and to function as LAN emulation servers mapping LAN frames onto ATM virtual circuits. About 77 Cisco LightStream 1010 ATM switches will serve as switch aggregation and access points and backbone nodes. All Ethernet and ATM links will be fiber.

About 82 Cisco routers will be part of the new net — an almost fivefold increase over USAA's current stock of Cisco devices. Between 15 and 20 of those routers will be Cisco 7513s, and USAA plans to replace about seven FEPs with channel-attached 7513s. The high-end boxes will also provide WAN access and firewalling, and a Cisco 4700 will route between VLANs.

And even though USAA is tearing out its IBM network, the company's IBM systems will remain. "We still feel most comfortable with our critical information on our IBM hosts," Grant said. "That is still a very major piece." ■

IBM gives a Java jolt to 3270 users

By Michael Cooney

Raleigh, N.C.

IBM's 3270 users can warm up to the Internet with new server-based software from Big Blue.

The company last week debuted Host-on-Demand, a free, Java-based package for its Software Server line that lets traditional 3270 users gain access to mainframe-based SNA applications over the Internet.

"The key to this product is that users don't need to have a 3270 emulation package and a browser to make it work," said William Duncan, manager of the enterprise communications software business for IBM.

Host-on-Demand works when a user on any Java-enabled browser clicks on a SNA application hyperlink. Host-on-Demand then downloads a tn3270 emulator to the browser. Once the browser window is closed, the emulator goes away. The IBM Communication Server controls the Host-on-Demand product, and any changes or updates are done on the server.

IBM's Host-on-Demand product comes on the heels of another 3270-to-Web product introduced by White Pine Software, Inc. called WebTerm, which lets terminal users access IBM mainframe or Application System/400 hosts, as well as Unix and Digital Equipment Corp.-based servers, using a regular Web browser as the client (see story, page 17). Legacy-to-Web access products are creating a rapidly growing market as vendors struggle to provide the millions of terminal users easy access to the 'Net.

A beta test for Host-on-Demand will be launched this month. More information can be found at http://www.raleigh.ibm.com/hex/hexprod_en.html. ■

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Circle Reader Service #**55**

Novell

Continued from page 1

its own directory service. By giving away the base NDS code, Novell is gambling that it can speed up adoption of NDS before the window of opportunity closes.

"The goal is to make NDS a service for the entire network, not just NetWare," said Tom Arthur, vice president and general manager of Novell's Internet Infrastructure Division (IID).

Michael Simpson, director of marketing for IID, said the company cannot reach this goal without recruiting partners.

"OEMs are crucial for universal adoption. Microsoft proved that with Windows," Simpson said. "We understand OEMs need to add value to their products without any added costs."

Should Novell be successful in its quest for NDS ubiquity, its customers will benefit from the ability to better manage users and resources across heterogenous environments.

Novell first announced its strategy to sell NDS apart from NetWare about a year ago. Since then, the company has struck deals with only two Unix vendors and a handful of telephone companies.

Industry observers say Novell should have moved sooner with an agressive NDS distribution plan to maintain its directory lead.

"They had to do something bold to hold off the NT momentum and squelch the growing feelings among NetWare users that Novell as a company was going nowhere," said Cheryl Currid, president of Houston-based consultancy Currid & Co.

NDS SPREADS OUT

- **September 1995** Novell announces plans for stand-alone NDS.
- **June 1996** SCO ships UnixWare 2.1 with NDS ties.
- **July 1996** HP licenses NDS.
- **November 1996** Novell offers free NDS source code; Sun licenses it.
- **December 1996** LDAP support to be added.
- **Early 1997** NDS for NT beta version due.
- **Mid-1997** Novell to offer replication and certificate services for NDS.

NDS providing connectivity between IntranetWare, Unix, NT and networked applications is a strong argument against ripping out existing NetWare LANs in favor of a strictly NT-based network, said Dave Cappucio, vice president of network technology for Gartner Group, Inc. in Stamford, Conn.

"Novell has an 18-month window to make a go of this before Microsoft offers a comparable solution," he said.

Sun takes NDS plunge

Sun Microsystems, Inc. was the first vendor to collect on the free license offer.

Sun will support NDS as an optional directory service on top of its Solaris operating system. Solaris ships with an integrated directory service called Network Information Service (NIS), as well as additional options for Domain Name Service and X.500 directories.

"We look at this relationship as a coexistence. We are not replacing NIS with NDS," said Sanjay Sinah, marketing manager for Solaris. Sun expects to deliver NDS on Solaris sometime next year.

As part of the same agreement, Novell announced its plans to license and distribute two of Sun's Java-based tools — the Java Workshop development tool and Just-In-Time compiler — which will make it easier to develop and run NDS-aware Java applications on IntranetWare.

Additionally, Novell licensed Sun's WebNFS technology for use in its NetWare NFS product, which will allow a WebNFS-enabled browser or client to access information on Novell servers over intranets or the Internet.

Sun joins The Santa Cruz Operation, Inc. and Hewlett-Packard Co. as Novell partners.

IID's Simpson indicated other pending agreements but declined to give details. Industry observers said likely candidates for free future NDS licenses are IBM and Netscape Communications Corp.

> *"OEMs are crucial for universal adoption. Microsoft proved that with Windows," said Michael Simpson, director of marketing for IID.*

"Getting OEM partners means that Novell is halfway there," said John Oltsik, a senior analyst with Forrester Research, Inc. in Cambridge, Mass.

"The mind-set out there right now is that NDS is not even a good future strategy for the NetWare installed base, let alone for every other operating system. It is going to take a monumental marketing effort by Novell and its OEMs to overcome that," Oltsik said. ■

Netiva

Continued from page 1

enabled Web browsers.

Users will not need to download any applications and will be able to access databases simply by clicking on a URL, rather than feeding requests through a Web server with a database interface.

The company has developed an interface between the Java client and the database engine that allows them to interoperate seamlessly, said Kevin Compton of venture capital firm Kleiner Perkins Caufield & Byers (KPCB), which is funding the start-up. The administrator retains sole control of the database, and there is no need to update individual clients as content changes. Each time users access the database application, they are using a current version.

Today, browser users must typically access databases through a Web server-based gateway, such as the Common Gateway Interface, and pull down results of queries or canned procedures.

The Netiva line would enable them to work with the database as if it were local.

Further details on the Netiva line were not available, and company officials refused to comment on the products.

Compton said the product line is aimed squarely at workgroups building Web-based applications. "It is not going to replace a big Oracle or Informix database, but it is going to be wonderful for the small workgroup," he said. "It's a very cool architecture."

The Netiva staff includes Steve Pollock, former vice president of product management at Claris, and Dennis Marshall, former product manager at Claris.

Netiva is the fourth company backed by KPCB's $100 million Java Fund (see graphic), which is supported by corporate partners, including Sun Microsystems, Inc., Oracle Corp., IBM and Compaq Computer Corp. The fund was set up to support ventures targeted at new markets for Java technology.

Netiva was added to the list in October, and Compton said the fund will back between four and six companies annually. As for upcoming fund contenders, Compton said there are many from which to choose.

"There is a long list that are close, but none have been committed to yet," he said. ■

HAVE CASH, WILL FUND JAVA

In addition to backing Netiva, Kleiner Perkins Caufield & Byers' $100 million Java Fund supports three other companies:

- **Active Software** makes the ActiveWeb communications system to enable Web-based applications to interoperate easily with legacy systems.
- **Calico Technology** develops sales force automation configuration software that can be customized by users.
- **Marimba** manufactures Castanet software, which automatically updates Java applets on a user's desktop when connected to the Internet, and Bongo, a Java development environment.

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Lost in directory space: Novell sees the light (and how not to use a Ferrari)

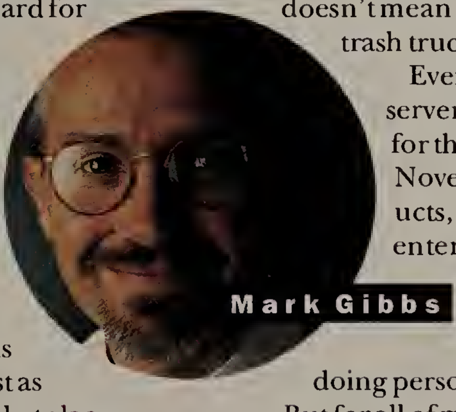
It seems that most of the time, I tend toward a curmudgeon only view of the industry. This is not surprising as most vendors exhibit corporate competitive behavior that would embarrass a 10-year-old.

However, every now and then, along comes a piece of clear, competitive thinking that deserves recognition. Therefore, the Gibbs Institute recognizes Novell for opening its Novell Directory Services (NDS) to the market.

Novell announced it will let operating system vendors incorporate NDS source code in their products . . . for free!

And even more aggressively, Novell will allow application developers free use of NDS access binaries so they can interact with the NDS system to search for, modify and add objects.

Why should Novell behave so apparently altruistically? Because it wants NDS to define the market standard for directory services. Novell expects to have a whole raft of vendors supporting NDS (The Santa Cruz Operation, Inc. is already shipping product, and Hewlett-Packard Co. is currently in beta).



The strategy behind this is to end run Microsoft. Just as Win32 is a given in the marketplace, so Novell intends NDS to be the de facto directory service — to become another market "given."

Obviously, Microsoft isn't interested in joining the NDS party, so Novell will be releasing an NDS service for NT early in 1997.

What's interesting is that NDS is turning into a network service gorilla. The NDS core already comes with a slew of APIs that allow for a huge range of operations on directory objects, and the future promises a Lightweight Directory Access Protocol API, a Domain Name Service server and a Dynamic Host Configuration Protocol server.

In an important sense, this represents the reinvention of NetWare.

Despite the marketing wars between Novell and Microsoft, I don't believe they are really in the same markets.

Just consider: NT is an applications server and a pretty damn good one. It is essentially an information technology tool. On the other hand, NetWare is the most powerful file and print server with industrial-grade security. It is essentially a data processing tool.

NDS is turning into a network service gorilla. In an important sense, this represents the reinvention of NetWare.

This differentiation is important. If you're buying NetWare for personal productivity, you're buying it for the wrong reason. If you're buying Windows NT for enterprise service, the same applies.

Sure, I know that either system can be used outside of its target context, but just because you can haul garbage in a Ferrari doesn't mean a Ferrari makes a good trash truck.

Even with the addition of server-based Java support for the next release of Novell's Green River products, NetWare remains an enterprise tool. The Java applications you'll run won't — and shouldn't — be doing personal productivity stuff.

But for all of my applauding of Novell's initiative, I wish it could have moved faster on this. The issue of directory services is more important than simply a competitive issue for Novell.

At the heart of electronic commerce are several key issues: Security, nonrepudiation, integrity and accessibility. I would (and will argue) that without the latter, there is no online marketplace.

It comes down to: If you can't find what you want online in a simple way, electronic commerce will only service the digerati — those comfortable with the eccentricities of computer systems.

Banyan could have filled this role with StreetTalk, but. . . well, the less said about that the better (oh, and so long, Mr. Mahoney).

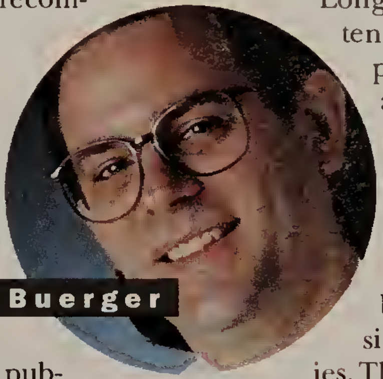
Novell stands a better-than-even chance of setting one of the most important standards for the future of electronic commerce.

Do you think Novell will succeed? Drop me a note at mgibbs@gibbs.com or call me at (800) 622-1108, Ext. 504.

FCC's gift of universal service to schools will cost you dearly

The season for giving is in full swing. I know this because I've already tossed about two dozen Christmas catalogues. Judging from the quality of these glossy, four-color pieces of art, sellers must anticipate large donations from me will pay their costs.

Some gifts are not so voluntary. Earlier this month, a Federal Communications Commission special board recommended a dramatic expansion of universal service handouts. Despite good intentions, their directive will become a sinkhole costing typical ratepayers unknown billions in extra annual fees.



The plan will make telecom services more affordable to public schools and libraries by extending benefits under universal service. Eligible organizations will get discounts of 20% to 90% off the sticker price of services. The FCC estimates about a third will get at least 80% off.

This goal seems unimpeachable. That means no one in their right mind would dare challenge the proposition's goodness. Funding this goodness will cost $2.25 billion per year, according to the eight-member Federal-State Joint Board's recommendation (www.fcc.gov).

Universal service is a classic example of the haves funding the have-nots.

The number is bogus. It will be higher — much higher. Since when did a government program ever hit its numbers? Dissenting FCC commissioners questioned the number. You should be even more skeptical because each penny of the universal service fund comes from you or your company.

Universal service is a classic example of the haves funding something for the have-nots. Lower income people or folks living in remote locations receive a subsidy for basic telephone service, paid for by raising everyone else's service fees.

Universal service is a mess. No one knows how much it really costs. A lawyer at the FCC would not tell me the size of the Universal Service Fund. Actually, she said she didn't know the number or even a ballpark figure. She said some parts of the fund are explicit (known) and others are implicit (hidden); estimates vary depending on your prediction model.

Long-distance and local phone companies disagree on describing the cost of universal service. I've seen estimates that put the current total subsidy at $21 billion. That's 13% of all local and long-distance service revenue.

Long-distance companies contend that's too much. They say prices for the local loop are above their economic cost. MCI says the fund should be $4 billion to $6 billion. The Bells tend to differ.

As if this mess weren't enough, now the FCC's board wants to add new subsidies for schools and libraries. The board actually is following the Telecommunications Act of 1996, which mandates the continuation of universal service. Unfortunately, it exceeded that mandate.

The act's language explicitly focused on *services*. But the board added universal service funding for intraschool and intralibrary internal connections — a.k.a. inside wire. Wiring all public classrooms will cost $6 billion, plus $560 million per year in operation and maintenance, according to one study.

And that's just the start. The board ignored a host of other capital costs and expenses required to use subsidized services. After all, *access* to the information highway requires PCs, modems, software, phones, training and a new support infrastructure.

That $2.25 billion suddenly looks like a spit in an unfunded ocean.

The other issue ignored by the board is what the kids will do with advanced telecom services.

Perhaps universities give us a clue. *The New York Times* said the most popular network application on campus is E-mail. According to one student, "It's the No. 1 way that romances go on at colleges. It's like the dating game online."

Clearly, the board's good intentions got out of hand. Their "gift" of forced subsidies will throw billions of dollars at a partial solution, frustrating students and teachers, and angering people who have to pay the bill.

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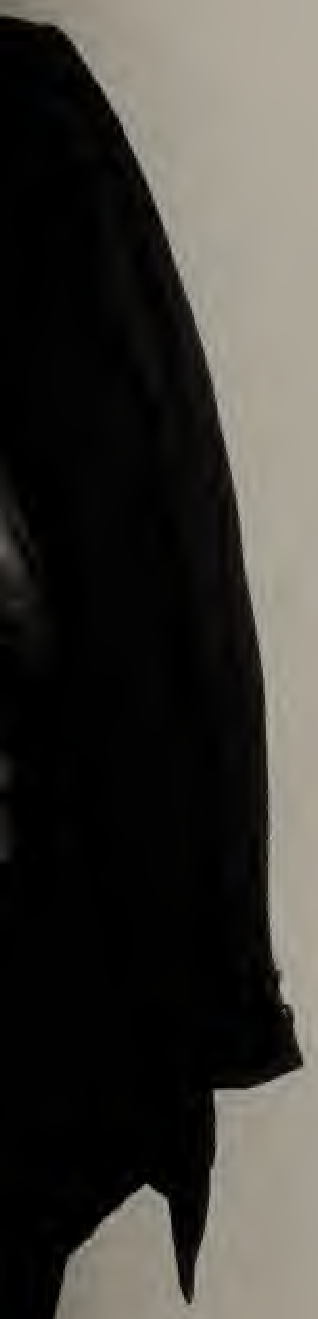

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